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CONTENTS—NOVEMBER, 1930

VOLUME XI, No. 11

ORIGINAL ARTICLES

Physical Therapy in Orthopedic Practice.....Daniel H. Levinthal, M.D., F.A.C.S. 583
The Heat Treatment of Acute Gonorrhea in The Female.....Mortimer N. Hyams, M.D., F.A.C.S. 588
Contribution To The Importance of Biomicroscopy in Ophthalmologic Diagnosis.....Ramon Castroviejo, M.D. 595
Electro-Surgical Destruction of Recurrent Lymphoid Tissue After Tonsillectomy.....A. R. Hollender, M.D. 600
Physical Therapy in Eye, Ear, Nose and Throat Practice.....Ira A. Denman, M.D. 602
The Diathermy Apparatus: Suggestion On How Best to Use It.....H. G. Fischer 604
Report of a New Pelvic Diathermy Electrode.....M. A. Roblee, M.D. 607

SPECIAL SECTION

Queries and Clinical Notes..... 610

EDITORIALS

Electrosurgical Extirpation of the Tonsils and Recurrent Lymphoid Tissue After Tonsillectomy 613
Physical Therapy in Angina Pectoris..... 615
Books and Writings on Physical Therapeutics—A Word of Warning and Some Suggestions.... 616
The Growing of Cancer Cells..... 617

PHYSICAL THERAPY CLINICS

Physical Therapy as an Adjunct in the Treatment of Hay Fever and Asthma.....Carl B. Sputh, M.D. 619

CURRENT NEWS AND COMMENT

Miscellaneous Items of Interest..... 622

THE STUDENTS' LIBRARY

Book Reviews 630

INTERNATIONAL ABSTRACTS

Abstracts of Articles on Physical Therapy, X-Ray, Radium, Biophysics and Allied Subjects..... 633

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*King, J. Cash, and Cocke, Edwin W.: Therapeutic Fever Produced by Diathermy, with Special Reference to its Application in the Treatment of Paresis. South. Med. Jour., Mar., 1930.

See also Illinois M. J., LVI:3:203, Sept., 1929, "Artificial Fever Produced by High Frequency Currents—Preliminary Report." By Clarence A. Neyman, A.B., M.D., and S. L. Osborne, B.B.E

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PHYSICAL THERAPY IN ORTHOPEDIC PRACTICE *

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The value of physical agents in the treatment of the ills of mankind has been well known for thousands of years. History records worship of the sun-gods as early as 1400 B. C. The ruins of the elaborate baths of the Egyptians and Romans attest their knowledge of hydrotherapy. Massage was practiced and described by Hippocrates.

The present age of specialization, in the trades as well as the professions, has separated the treatment by physical agents into a well defined specialty, requiring an intimate knowledge of physics as well as a special understanding of orthopedic and medical management.

Modern progress in the industries has created the industrial surgeon and has enlarged the scope of the work of the orthopedic surgeon to include recent injuries to bones and soft tissues concerned with movement. These surgeons must not only be familiar with the immediate surgical care of the individual, but must bear in mind the early return of function to the parts involved. An intimate knowledge of physical therapy has been found to be essential. The writer prefers to include under the term "physical therapy" not only the procedures and modalities of physical therapy *per se*, but also mechanotherapy, hydrotherapy and occupational therapy.

The scientific advance of physical therapy in this country can be largely attributed to the diligence of the Council on Physical Therapy of the American Medical Association. The members of this Council have helped to determine the value of various modalities offered by manufacturers to the gullible public and cultists as well as to the physicians. There is at present a too generalized application of methods of treatment by the unskilled, frequently without knowledge of indications or contraindications.

In its last report, the Council on Physical Therapy has stated that "In all of its educational activities this Council endeavors to point out the importance of physical therapy in medicine as an adjuvant rather than as a sole method of treatment. The council expressed its opinion that too much emphasis has been placed on apparatus therapy and not enough on the possibilities of such measures as heat, massage, therapeutic exercise and occupational therapy."

Kovacs has given the following as the main indications for the application of physiotherapy in joint lesions.

In Traumatic Conditions.—The acceleration of the process of repair and of the restoration of function by the increase of local circulation; the promotion of absorption; the prevention of adhesions; the relief of pain; the relaxation of local muscle spasm; later, the restoration of mobility.

In Acute Inflammatory Conditions.—The combating of the infectious process and relief of pain.

In Chronic Inflammatory Conditions.—The improvement of local circulation; the softening of adhesions; the removal of inflammatory products; the relief of pain; the increase of mobility. In sluggish or infected wounds, chronic ulcers; sterilization and mild stimulation.

In Paralysis.—The promotion of local circulation; the improvement of nutrition and maintenance of the mobility of joints. In weak, flabby, but not paralyzed muscles, their strengthening.

In Contractures and Scar Formations.—The softening and stretching of scar tissue to increase mobility.

In the work of the writer, the patient is referred to the physical therapy department of the hospital or to the laboratory of a recognized physical-therapist. The patient brings with him a note showing the diagnosis, date of operation or injury, and the type of treatment recommended. The physical therapist examines the patient and determines the extent of treatment by the various agents recommended, consulting with the attending physi-

* Read before the Ninth Annual Meeting of the American Congress of Physical Therapy, St. Louis, Mo., September 8, 1930.

cian prior to the treatment and at frequent intervals during the course of treatments.

The following measures have been of the greatest value in the after treatment of my cases.

Heat—

Baking by the electric baker or oven
Contrast baths or sprays
Whirlpool baths
Paraffin baths
Diathermy
Infra red rays

Mechanical Agents—

Massage
Mechanical vibration
Exercises, active and passive, including those under water

Manipulation; passive movement and stretching, including mechano-therapy, the utilization of apparatus for assistive and resistive exercises.

Electrical stimulation; static wave, galvanic, faradic and sinusoidal currents.

Ultraviolet therapy, natural and artificial.

Most orthopedic conditions require some physical therapy as a part of the active treatment. In full agreement with the Council, we always employ all recognized measures for the relief of the patient, physical therapy being the adjuvant. A few examples of conditions in which physical therapy plays an important part is now presented for your consideration.

Arthritis.—Almost every known form of physical therapy has been used in arthritis with varying results. There is no doubt that physical measures should be beneficial to the patient when applied scientifically, that is, by or under the control of a physician after a very careful examination and recommendations by the attending physician. If the condition is acute, rest and external heat are indicated. More vigorous measures may be distinctly harmful. By rest, we mean proper immobilization by plaster, splints, or braces in the position of maximum functional efficiency. A moderate amount of traction, properly applied, lessens muscle spasm and helps to relieve pain. In applying traction, moleskin adhesive is smoothly applied to the shaven limb. The adhesive should be wide, directly proportional to the width of the limb. Pads of felt or sheet wadding are placed over bony prominences and superficial peripheral nerves, such as the ulnar nerve around the internal epicondyle of the humerus and the peroneal nerve around the neck of the fibula. In order to facilitate the application of physical therapy, we frequently apply traction to the lower extremity by means of a canvas anklet which is well padded. Occasionally, a double clove hitch is used for traction to either the wrist or ankle.

As the arthritis becomes subacute, massage above and below the affected joint is indicated. Gentle electrical stimulation enhances the circulation and aids in preventing atrophy. *Warm or hot joints must be very cautiously treated.*

Chronic arthritis requires daily baking, massage, diathermy and perhaps electrical stimulation. The most severe cases are hospitalized and receive treatments twice daily. The severe ambulant cases receive more intensive treatment. We usually supplement the treatment of the physiotherapist with the use of an electric baker at home for several hours every day followed by massage. The infrequent type of treatment, once or twice a week, is ineffective. Therapeutic exercises, followed by occupational therapy, is an important part of the treatment.

Gentle manipulation is frequently necessary in those cases of fibrous ankylosis following severe periarthritis and in some cases of specific arthritis such as complicates some cases of gonorrhea, scarlet fever, etc. This is done under deep anesthesia. The object is to stretch rather than tear the resistant pericarticular structures. Where the tissues are extremely resistant one must tear some of the adhesions. The operator must not, however, attempt to force the limb through a full range of motion during the first manipulation, nor should the old-fashioned "pump-handle method" be used. Very short leverage must be used as atrophic, long bones are very easily fractured. The limb is gently flexed through an arc of about fifteen to twenty-five degrees beyond the patient's active range, and is then fully extended. It is then placed in the position of election and a compression bandage is applied. The joint is then surrounded with ice bags for twenty-four to forty-eight hours depending upon the reaction. If there is much pain, traction may be applied. As soon as the reaction permits, the limb is baked, the muscles are deeply massaged and then stimulated with the electric current. The whirl-pool bath or underwater exercises are very beneficial at

this time. Active and passive exercises and mechano-and occupational therapy are very necessary. When the joint outlines are more nearly normal and there is no longer evidence of inflammation from the previous manipulation, the patient is again anesthetized and the limb is carried through an increasing range of motion, adding from fifteen to twenty-five degrees to the arc of the previous manipulation. It may be necessary to repeat these maneuvers from three to ten times before the maximum range of motion is attained.

Cases of destructive arthritis as well as fractures and injuries which result in restricted joint motion require arthroplasties. These patients are given carefully supervised physical therapy before and after operation in order to improve the tonus of the parts.

The recent work of Swaim emphasizes the importance of improving the posture of the patient in arthritis. Proper posture increases the aeration of the lungs, raises the diaphragm and abdominal viscera, and improves the metabolism. When resting, the joints should be supported by molded casts or light splints in the position of maximum functional efficiency. It is frequently necessary to have the patient rest in a posterior plaster shell which has been molded well under the lower ribs to prevent sagging of the thoracic cage.

It is important at this time to stress the position of election for joints, that is, the angle which gives the greatest functional capacity to the parts involved. It is of course far easier to maintain this position early in the course of a disease or injury, than it is to regain it after the deformity has become fixed. For example, it is not uncommon to see a patient who has had an arthritis involving the spine, walking with his neck protruding from his chest at an angle of forty-five to ninety degrees, his eyes glued to the sidewalk. We know that this person has been propped up in bed with numerous pillows under his head and perhaps some under his knees, and that, when he attempted to assume the vertical position, no support was given to relieve the diseased spine from the superincumbent weight above it. Properly treated, such a patient when recumbent should have had a moderate amount of head traction with the head of the bed elevated, and *no pillows* under the head and neck. If any pillows are used, one could be placed under the middle thoracic region to hyperextend the spine to relieve the vertebrae and intervertebral discs of pressure. When such a patient assumes the vertical position his spine should be protected by a properly fitting brace.

In shoulder disease or injury, knowing the value of the scapular muscles, it is advisable to treat such cases in abduction. Those in which the greater tuberosity or the subdeltoid or subacromial bursae are involved require external rotation as well as abduction. Those cases in which an impairment of range of motion is expected, must not be permitted to ankylose with the arm against the chest wall, but should be held out in about seventy degrees of abduction with the shoulder anterior to the coronal plane of the body, (the position of salute). When there is a possibility of ankylosis of the elbow, it should be held at about a right angle. The angle may vary somewhat, depending upon the occupation of the patient, but the elbow must not be permitted to ankylose in extension.

The radio-ulnar joints give the maximum function midway between pronation and supination. The wrist joint should always be held in the cock-up position. One need only attempt to firmly flex the fingers with the wrist in palmar flexion and compare it with the exellent grip when the wrist is dorsiflexed to be convinced that all cases with wrist involvement should be supported in the cock-up position. We frequently see patients who have had disease or injury to the forearm or wrist walking about with a sling extending to the wrist, the hand palmar flexed. This is an error in sling technique. The position of best function for the fingers is that of semiflexion and for the thumb, midway between abduction and adduction.

In the lower extremities, the most frequent deformities seen and the ones we must avoid are flexion adduction of the thigh, flexion deformity of the knee, and plantar flexion of the foot.

It may be argued that apparatus prevents proper treatment by the physical therapist. It is therefore essential that the physical therapist be well versed in the application of apparatus so that he may when required, remove splints or braces and give treatment and then properly reapply the device. As a matter of fact, it may be occasionally necessary for the physical therapist to recommend apparatus to the attending physician.

Acute Anterior Poliomyelitis.—The orthopedist is usually called in immediately by the atending physician who realizes how important it is to properly splint the limb in the position of relaxation for the paralyzed muscles. As the tenderness disappears, gentle, smoothing massage and muscle reeducation is started. This is done in bed or in the bath. Contrast sprays to the affected limbs help to promote the circulation.

As soon as indicated, properly fitting braces are applied. These support the paralyzed muscles, holding them in a relaxed position. It is essential that braces be worn at night. One must remember that over-stretching for even a few minutes may undo all the beneficial effects of the previous support. Gravity and the pressure of blankets and sheets help to produce an equinus.

Muscle reeducation in the under-water gymnasium has been very effective in the stage of convalescence.

In neglected cases, for example, one frequently observes conditions of foot-drop with contracted heel cord; it may be necessary to ask the physical therapist to use the Shaffer shoe to stretch the tendo Achilles preliminary to muscle reeducation. In the more severe cases, tenotomy or tendon lengthening of the heel-cord is necessary. It is useless for the physical therapist to continue to stretch and hurt the patient with an extremely resistant contracted heel cord. In infants, we either do a subcutaneous tenotomy or subcutaneous tendon lengthening. In children and adults we frequently do an open tendon lengthening. A cast is applied with the foot in dorsiflexion. In three to six weeks the tendon is united. Then we should resume our physical therapy.

Chronic cases of poliomyelitis are those in which more than two years have elapsed since the onset of the disease. In order to give further improvement in function and to allow the patient to discard braces, it may be necessary to operate. Performed properly, the results have been most gratifying. The following operations have been particularly effective:

Arthrodesis of the shoulder in the position of election is necessary in deltoid paralysis.

Arthrodesis of the elbow, wrist, hip, knee and foot. Several types of stabilizing operations involving tarsal and panastragaloid arthrodesis are done. In addition astragalectomy gives very favorable results in selected cases.

Spine fusion for paralytic scoliosis.

Tendon transplantation is usually combined with some stabilizing operation. It gives a return of muscle balance. Some of the most common tendon transplantations are those in which the wrist flexors are transferred to the wrist and finger extensors, and those cases in which one of the everters of the foot (peronei) is transplanted to the attachment of the tibialis anticus. In some cases of gastrocnemius paralysis one of the peronei and perhaps the tibialis posticus tendons may be transferred to the tendo Achilles and into the os calcis.

Fasciotomy, e. g., of the plantar fascia for hollow foot (pes cavus).

Transfer of attachments of muscle origins, e. g., of the origin of the wrist and finger extensors from the region of the external peicondyle of the humerus to a point higher upon the anterior aspect of the humerus. This causes these muscles to act as elbow flexors as well as finger and wrist extensors.

Other operative procedures and combinations of those mentioned above are performed, and they are too numerous to describe in the limited space of this paper. All of them are followed by careful physical therapy.

Scoliosis.—Postural exercises and corrective gymnastics are absolutely essential in the treatment of curvature of the spine. As with other physiotherapeutic measures, much harm can be done by incorrect exercise, over-exertion or too infrequent gymnastics. The myogenic theory of the etiology of scoliosis is basically correct. This includes congenital muscular disturbances such as those seen in *amyotonia congenita* as well as acquired disease causing muscular disbalance, the most important being infantile paralysis. Any exercises which tend to limber up vertebrae which are fixed in a scoliotic position should be followed by the application of some properly fitting retentive apparatus, such as a plaster jacket or brace, as the superincumbent weight of the torso will tend to collapse the vertebrae to their original positions or worse. Prior to fixation, either external by plaster, or internal by spine fusion operation, it is best to place the patient in bed, hyperextended on a frame with pelvic and head traction, permitting relief from this position for exercises twice a day in the gymnasium and swimming pool. Breast stroke swimming involving symmetrical groups of muscles is ideal. Side

stroke, crawl or trudgeon with the low shoulder advanced is recommended.

Careful photographic and descriptive records are kept before treatment is started and at frequent intervals during the course of treatment.

Spastic Paralysis.—Underwater exercises, massage and table exercises combined with orthopedic operations and braces when indicated, have improved our cases of spastic paralysis. As the physical condition is enhanced, we have noted mental improvement. The important point is to know when the maximum results from the more conservative measures have been attained and when operative procedures are indicated. The operations may be simple tenotomies, tendon lengthening, arthrodeses correcting foot posture, capsulotomies, peripheral nerve action either partial or complete, nerve root section or sympathetic ramisection. Whichever operation or combination of operations is done, the end results will be better if followed by properly applied physical therapy.

Circulatory Disturbances of the Extremities. — Whether the condition is neurovascular spasm or mechanical, arterial or venous obstruction, the greatest improvement in these cases is due to persistent intensive physical therapy over a long period. We might include under this heading the circulatory disturbances observed particularly in the lower extremity after it has been immobilized in a cast or splint following a fracture, or after prolonged infection in an extremity. It is well to apply a thin semi-elastic bandage after each treatment of this type of case. Baking, diathermy, exercises and sometimes massage are indicated. Sinusoidal stimulation to the weakened muscles may be considered a form of passive exercise. Cases of mechanical, arterial or venous obstruction or those of infection should not be massaged. Burns from the baker or diathermy may start gangrene and result in amputation.

Surgical Tuberculosis.—Rollier, Calve, Sir Henry Gauvain and numerous others have shown us the value of ultraviolet therapy in tuberculosis. The beneficial effect of direct natural sun rays is known to the laity as well as the profession. The relative merits of the quartz and carbon arc lamps seem to be still controversial. Nevertheless, their beneficial effects in the treatment of these cases is certain, although not as great as natural heliotherapy. We must remember that combined with the latter we have the beneficial effects of fresh air baths and, perhaps, mountain or seaside climate.

Osteomyelitis.—What has been said about the treatment of tuberculosis by physical agents may also be said about the treatment of osteomyelitis. As in tuberculosis generalized ultraviolet therapy improves the metabolism and raises the resistance.

Post-Operative.—In certain post-operative conditions treatment by physical agents materially hastens the return of power to atrophied tissues, and shortens the period of convalescence. For example, following operations on the knee joint for internal derangements, it is very important to maintain the power in the quadriceps by early exercise and by quadriceps stimulation with the electric current.

Conclusion

In conclusion it is recommended that we strive to maintain closer co-operation between the clinician and the physical therapist, utilizing to the advantage of the patient all the physical agents at our command, with strictest regard for the limitations of such treatment, and the knowledge in all cases that surgical and medical measures are predominant. We must take cognizance of the harmful possibilities as well as the beneficial effects of such treatment. We must not judge our results or lack of results until we have a complete knowledge of the original condition and the surgical or medical measures which have been given prior or coincident with the physical therapy. We must also know whether the treatments were started at the proper time and whether the duration of each treatment and the intervals between treatments were adequate.

104 South Michigan Avenue.

THE HEAT TREATMENT OF ACUTE GONORRHEA IN THE FEMALE *

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It has been said that gonorrhoea is as old as the world. While history in a measure confirms the truth of this statement, the fact remains that gonorrhoea is still prevalent, and in spite of its long existence, successfully challenges our best efforts to combat its progress. Why should this particular disease prove so recalcitrant to our progressive and modern methods of treatment when so many other diseases which have resisted our medications in the past are now amenable to treatment? It is significant that the efficiency of the treatment of gonorrhoea has shown little if any progress, nor has any worth-while addition been made during recent years to what has already been known and practiced.

Gonorrhoea is a systemic infection with localized manifestations, which spreads by direct continuity or by the way of the blood and lymph channels, as is proven by infection of adjacent structures in the first instance, and in the second, by the appearance of a general gonococcal sepsis, while metastatic gonorrhoeal foci are not infrequently found in distant organs. Surely it is a formidable disease and one deserving of our best efforts, rather than the tolerant attitude assumed towards it by the profession in the past.

The gonococcus is essentially a human parasite. All attempts to grow it on animals have failed. It grows on, and in, mucous membranes, particularly on columnar epithelium, and thrives best at a temperature between 35-38 degrees centigrade. Air access is necessary for its growth, oxygen restriction causing colonies to grow poorly. Mucous membranes with columnar epithelium are only slightly resistant to the growth of the organism. Hence the lining of the urethra, cervix, body of the uterus, Fallopian tubes and rectum offer a good medium for its growth and development. The growth is not confined to the surface, for the gonococcus penetrates into the subepithelial stroma, into the submucous connective tissue and, in exceptional cases, into the deep musculature. While it is apparently easy to make a diagnosis by stained smears and the high power microscope, in reality, a positive opinion so necessary in medico-legal cases is possible only after culture. Much stress in the past has been placed on the finding of intra-cellular organisms in the stained specimens. Why such a statement was allowed to continue in force for so many years is beyond comprehension. The infecting organisms only become intracellular after the pus cells have taken them up in their phagocytic capacity. The so-called free organisms still present are just as infectious, if not more so, than those within the cells. It is time that these false conceptions of alleged importance of intracellular organisms be removed, and it is with that purpose in mind that I call particular attention to it now.

In the female there are two principal sites of primary infection, the urethra and the cervix. The Bartholini glands have been considered a third. Infection of Skene's glands, glands of Littre, Bartholini glands, endometrium, and Fallopian tubes is secondary to, and an extension of the original process. Fortunately, not all of these structures are simultaneously involved, while the cervix, owing to its anatomical position is almost always infected. The bladder on the other hand, rarely if ever, shows signs of invasion. The female urethra, lined with columnar epithelium offers a favorable location to the growth of the gonococcus with subsequent infection of associated tissues. It is claimed that the urethra offers a definite resistance to invasion, but positive proof is lacking. The fact that it is flushed at intervals by urine and has relatively good drainage, tends to lend an element of truth to this assertion. This is strengthened by the rarity of extension to the bladder, despite the shortness of the female urethra. However, when the cervix is involved, the

* From the service of Dr. Walter T. Dannreuther, Department of Gynecology, New York Post-Graduate Medical School and Hospital.

* Read before the Ninth Annual Session of the American Congress of Physical Therapy, St. Louis, Mo., September 8, 1930.

entire clinical picture changes. Here we find every condition favorable to the growth and dissemination of the gonococcus.

Let us bear in mind that instrumentation, trauma of child birth, and previous disease make the cervix more liable to infection by the gonococcus, for the reason that the natural anatomical door guarding the cervical canal is no longer functioning, and the road is open to any infectious process. Having gained entrance to the cervical canal, the gonococcus rapidly infects the glands and mucous membrane, producing the well known clinical picture with which every physician is familiar. If the process remains localized in the cervix, which it seldom does, the question of cure presents a problem which has been the subject of controversy for many years, and, even now, there is no unanimity of opinion as to treatment. Endocervicitis has created a vast amount of discussion in modern literature and the methods of its treatment are almost legion, varying from the simple douche to complete amputation of the cervix. In addition to infecting adjacent structure and glands, the infection passes into the pelvis, producing pus tubes with ovarian involvement, salpingo-oophoritis, and pelvic peritonitis with all its accompanying complications and disabilities — truly a symptom-complex to tax our ingenuity and therapeutic acumen to the utmost. Fortunately, all infections of gonorrhoeal origin do not result in such widespread sequelae. I have refrained from mentioning blood stream, cardiac complications, and lymphatic involvement of tissues and structures outside the pelvis as this presentation of necessity includes only the gynecological aspect of the gonorrhoeal problem.

It is readily apparent that the treatment of urethral infection differs markedly from that of cervical involvement. In the one case, we rarely see a chronic condition, whereas in the other, chronicity is the rule. The reason for the latter is apparent in that the anatomical and histological structures of the parts are favorable to the permanent lodgment of the gonococcus and, once infected, the cervix tends to harbor it indefinitely. So true is this, that in 1926, Walther made the statement: "It is the opinion of many physicians that gonorrhoea in the female is an incurable condition."

Much has been accomplished in the field of bacteriology as to the life cycle and growth of the various strains of the gonococci. What the future will bring in the continuation of this work may be beyond our comprehension. The work of Twort and D'Herlle, Rice and others, and particularly the laboratory and clinical study of the "Gonophage" by Pelouze and Schofield, have aided us to apply logical reasoning to bacteriological research. It offers us an explanation of the phenomena we encounter in the treatment of this disease and why the various microorganisms react as they do. Add to this the growing tendency to the acceptance of the self-limitation theory, the statement of Pelouze that the protective forces of nature cure the disease or in other words, that the patient cures himself.

The original idea in the treatment of gonorrhoea was to destroy the organism and many were the remedies advocated and used for this purpose. Needless to say, they did not live up to their reputation as gonococcocides, assuming that they possessed this power, and so other lethal agents were sought for, still groping in the dark for a specific panacea that did not exist, or if it did, it was a double edged sword because in destroying the bacteria it would also destroy the tissues in which they lodged.

With the advent of diathermy it was claimed that a means was at hand for a through and through heating of the tissues as the current produced heat in its passage between the applied electrodes. This seemed to be the solution of a difficult problem and enthusiastic workers soon published reports of their success in the medical journals. Tousey states that Santos succeeded in producing a complete cure of gonorrhoea in a single application of diathermy, lasting ninety minutes. Having a means at hand for heating tissues to almost any degree, naturally the question of how much heat was necessary to kill the gonococcus remained to be answered.

The experiments of A. D. Hirshfelder, 1925, and of R. N. Bieter of the Department of Pharmocology of the University of Minnesota, proved that even with large electrodes over large surface areas on anesthetized dogs, it was impossible to obtain 106-108 degrees Fahrenheit in the deep tissues without skin damage. Other investigators reported their results which are subject to wide variations, and no unanimous opinion exists.

If heat does not kill the gonococcus *in situ*, why does it give results when other methods

fail? While a correct answer cannot be given, we can, however, best advance our discussion by considering the recent discoveries in bacteriology. We believe that heat stimulates the tissues to renewed activity, and perhaps favors the conversion of an "s" culture into an "r" culture with its lessened virulence and greater sensitivity to phagocytosis which is augmented by the hyperemia produced by the heat. Perhaps Gonophage may also be an important factor, and by bringing about lysis of some of the bacteria, aid materially in their disappearance. It is reasonable to assume that this may be one explanation and, in any case, deserves further serious thought and consideration.

Heat treatment helps the patient cure himself by supposedly activating some little understood process which results in local beneficial effects. There is no question that good results follow the use of heat therapy; and although its use at present may be empirical, we are beginning to understand its mode of action. Heat will be used in the future in accordance with newly established rules and methods.

If failure to secure good results with the form of heat as produced by diathermy is discouraging, why not try heat in some form more amenable to application, easier to control as to temperature, and simpler for the clinician to handle, provided that the condition being treated is so located that this particular form of heat can be used? I refer to water, the oldest therapeutic agent known, maintained at a constant flow and at a definite temperature. With this thought in mind I devised two instruments, one for the cervix and the other for the urethra, to be used in conjunction with hot water under the conditions mentioned.

There are two types of the urethral instrument, the open and closed. The closed instrument consists of a hollow sound about one inch long and made in various diameters to conform to the size of the urethra under treatment. A hollow metal tube of lesser diameter traverses the central portion of the sound to

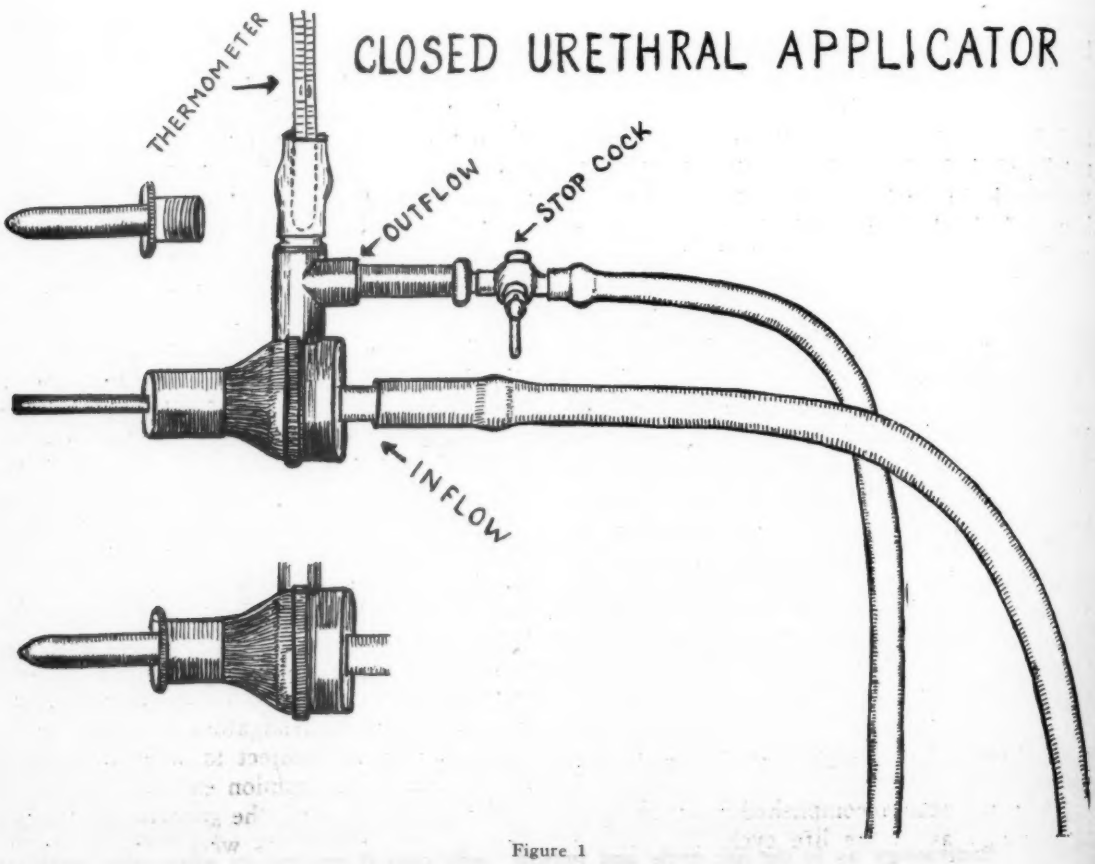

Figure 1

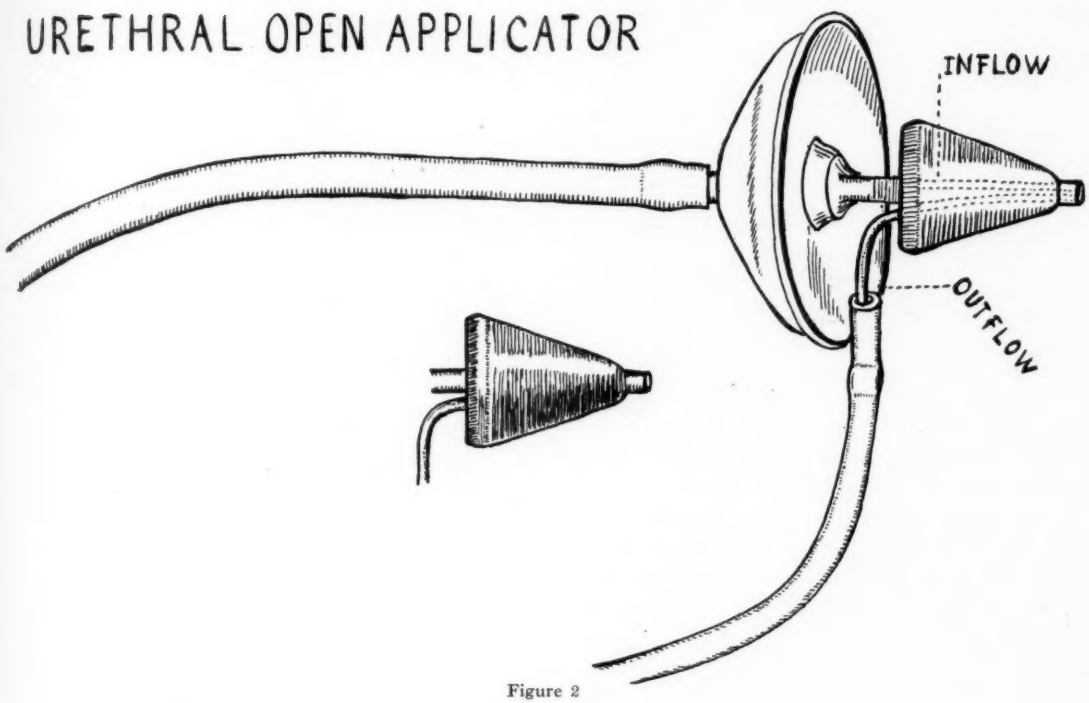

Figure 2

within one-quarter inch of its extremity, its proximal end being prolonged to facilitate its attachment to a rubber tube leading to the hot water supply tank. The outflow passes over a thermometer bulb, placed in the upper portion of the instrument, and is controlled by a stopcock which regulates the outflow and also the temperature of the water by increasing and decreasing the amount of the flow. The open, urethral instrument consists of a hard rubber cone-shaped body which has two tubes, small in diameter, passing through its center, one of the inflow and the other to carry off the circulating water. The apex of the cone permits perfect coaptation of the instrument to the mouth of the urethra, thus eliminating leakage and facilitates its distention. The local hydrostatic pressure helps to remove all folds and irregularities. (Figures 1 and 2.)

The cervical instrument consists of two separate parts. The vaginal portion is made of metal and hard rubber, shaped like an ordinary telephone transmitter, hollowed out to permit the passage of the light and telescope and a special metal irrigating sound, all of which are a part of the instrument proper. This part when introduced into the vagina makes a water tight joint and its conical form makes it possible to adapt it to the size of the vagina under treatment. The body of the instrument consists of a metal portion, tubular in form, about 1½ inches long and ¾ inch in diameter. Attached to it at right angles are two metal tubes of smaller diameter, one for the attachment of the electric cord, the other for the outflow of the irrigating water. The latter has an extension into which a thermometer is placed and, from its position, records the temperature of the outflowing water. This outflow is regulated by a stopcock at right angles to the tube containing the thermometer bulb. Two openings in the distal portion of the instrument carry a telescope and a special metal cervical irrigator. A clamp attached to the body of the instrument allows it to be held to the table during the treatment. The cervical irrigator is freely movable in the body of the instrument. The tip is about one inch long, slightly curved, is perforated laterally by twelve openings, equally placed, which carry the hot water into the cervical canal but prevent its passage into the uterine body. The body fits accurately into the opening of the vaginal portion, and when so fitted, completes the instrument. (Figure 3.)

The technic used in the treatment of gonorrhoeal urethritis is as follows:

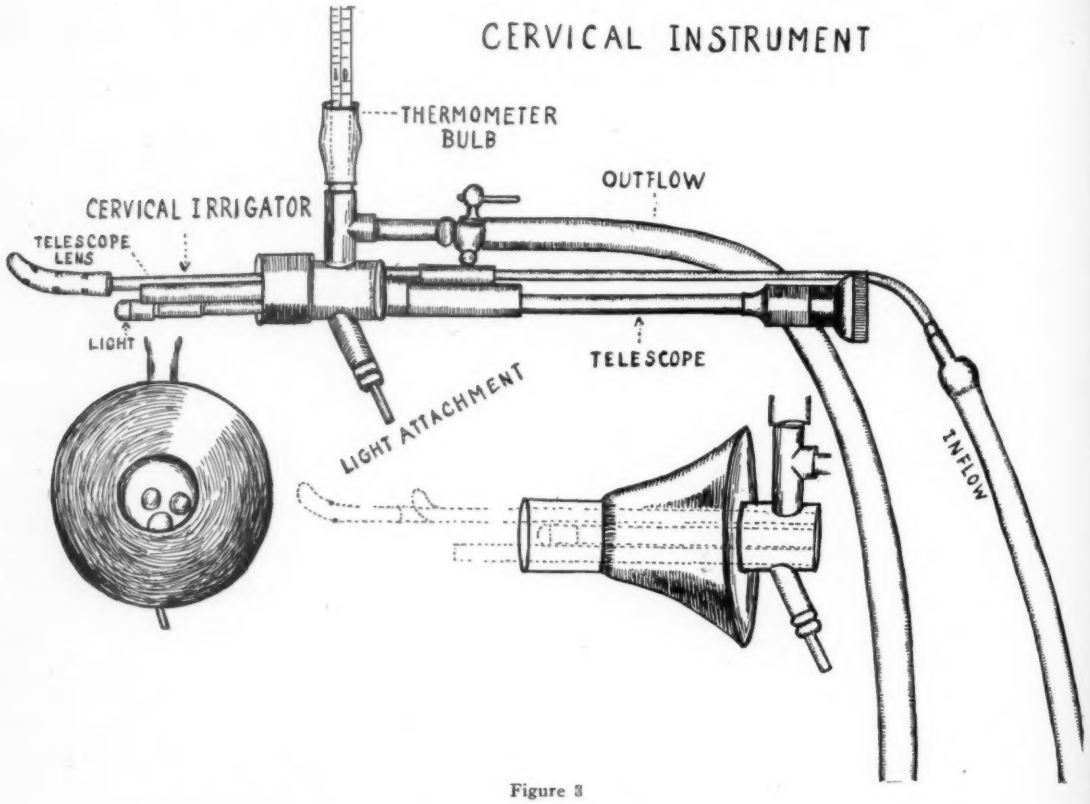

Figure 3

1. The patient is requested not to void for at least one hour before treatment.

2. The patient is placed in the lithotomy position, and draped in the usual way.

3. Urethral and vaginal smears are taken.

4. With a bulb syringe, one-half once of a silver solution is injected into the vagina, medicating the entire surface of both the vagina and cervix.

5. A pledget of cotton in placed in the vaginal opening.

6. The "open urethral applicator" is attached to the water tank and the external urethra irrigated.

7. About one-quarter of an inch of the applicator is then inserted into the urethra and held firmly against the orifice to prevent leakage.

8. The water is allowed to circulate for 25 minutes at a temperature ranging from 116-118 degrees Fahrenheit.

9. After 25 minutes, the applicator is removed, and cotton saturated with one of the popular silver solutions is inserted into the urethra and allowed to remain for ten minutes, at the end of which time it is removed.

10. The pledget of cotton is removed from the vaginal opening.

11. The urethra and vulva are then swabbed dry and thoroughly dusted with Xeroform and boric acid powder.

12. After the acute symptoms have subsided, the closed instrument is used for further treatment.

13. No treatment is given during the menstrual period, and the patient is instructed to stay in bed.

The patient is instructed to take Sitz baths at home, to be taken as follows: patient seats herself in the bath tub and allows the hot water to run slowly but steadily. She is advised to divert her mind by reading. This treatment is taken for 15 minutes, and is to be accurately timed. In addition to this she is given detailed instruction in general hygiene, regulation of diet and fluid intake, the care of the bowels. Rest periods during the day are ordered and avoidance of all strenuous work or exercise is specially stressed. Urinary antiseptics are always prescribed.

The following technic is used in the treatment of acute gonorrhoeal endocervicitis:

1. The patient is requested not to void for at least one hour before treatment.

2. The patient is placed in the lithotomy position and draped in the usual manner.

3. Urethral and cervical smears are taken.

4. The assembled instrument is inserted into the vagina until it fits snugly and without discomfort. The thermometer is inserted, the light attached, and the water tube connected to the instrument, and flow of water is started. The vagina immediately becomes distended and visual examination through the obturator shows the water loaded with pus and debris, giving the impression of a violent snow storm, temporarily obscuring distinct vision. This subsides quickly and by manipulation of the cervical applicator, its tip is inserted just inside the external os. The entire instrument is then held in place by a special holder and the treatment continued for 25 minutes with the circulating water at a temperature of 116-118 degrees Fahrenheit. Care must be taken not to permit any of the solution to leak and touch the skin as the patient will complain of severe burning. There is no discomfort as long as the circulating fluid remains confined to the vagina. The vagina is kept distended constantly by regulating the stopcock at the outflow. The duration of the treatment is accurately timed.

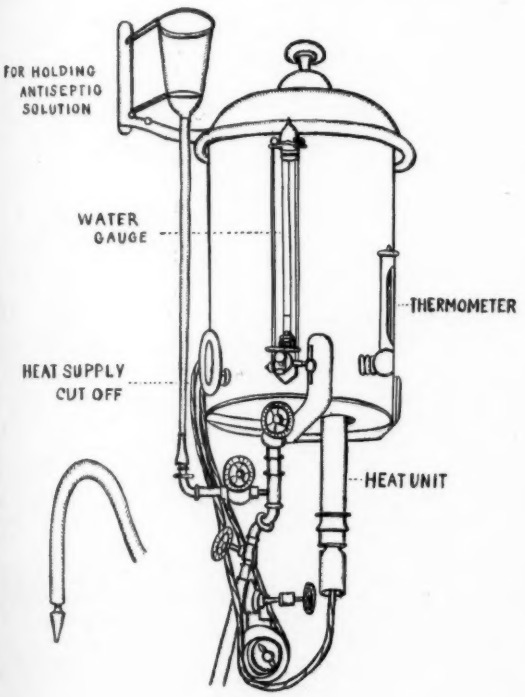

Figure 4

5. The flow of water is stopped, and the instrument removed.

6. One half ounce of a silver solution is injected into the vagina and allowed to remain for 10 minutes, the cervix being bathed by the same solution. The urethra, vestibule, and vulva are also swabbed with the same solution.

7. The parts are then dried and dusted with Xeroform and boric acid powder.

The patient is given the same instructions as to home treatment, general hygiene, etc., as those with acute gonorrheal urethritis.

The hot water may be supplied from an ordinary irrigating can or from a water tank heated by electricity with a special device automatically regulating the temperature. (Figure 4.)

Conclusions

1. The results secured by heat in treating acute gonorrhea warrants our giving it preference over other therapeutic measures.

2. Admitting that diathermy may be correct in theory, its practical application is often difficult, if not impossible.

3. Hot water provides a source of heat easily controlled and easily applied.

4. Uniform heating of the urethra as well as the cervix is possible by means of the hollow water heated sound.

5. Regulated heat is applied directly to the diseased tissues, and secretions and tissue debris are removed mechanically. The two processes take place simultaneously.

6. The urethra and vagina are distended by the irrigating solution, the entire area being accessible to and bathed by the circulating water.

7. The technic includes the use of silver salts as a recognized method of the treatment of acute gonorrhoea.

8. Further advances in bacteriological research on the biology of the gonococcus may ultimately lead us to the solution of the ideal treatment of gonorrhoea.

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CONTRIBUTION TO THE IMPORTANCE OF BIOMICROSCOPY IN OPHTHALMOLOGIC DIAGNOSIS

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The importance acquired by biomicroscopy in ophthalmology has suggested the choice of the theme of the slit-lamp in ophthalmic diagnosis, as it is a subject to the study of which. many investigators have applied themselves. In this paper, nothing new is presented, the object rather being to add a modest contribution, with the hope that it will prove a help to beginners in ophthalmology; also to those who are not conversant with this method and, consequently, are not familiar with its advantages in diagnosis. The use of the slit-lamp makes ophthalmology one of the leading specialties, reaching, as it does, in diagnostic delicacy to the frontier of histopathology of the living eye, showing the limits and outline of the single cellular structure as observed in the corneal endothelium, newly formed vessels, circulation of the blood corpuscles, corneal nerves, etc.

The principle of this method is the utilization of a powerful beam of light, which traverses the transparent ocular structures, and produces an optical section which is magnified and observed stereoptically by a binocular microscope.

According to the position of the light and the focus of the microscope, several methods of illumination are produced, as follows:

1. Direct illumination (Fig. 1).
2. Diffuse illumination (Fig. 2).
3. Indirect, or lateral, illumination (Fig. 3).
4. Oscillatory illumination (Fig. 4).
5. Transillumination or diaphanoscopy (Fig. 5).
6. Examination of reflecting surfaces (Fig. 6).

The figures explain sufficiently the technique of all these now well known methods, and we wish to emphasize only one of them, namely, transillumination or diaphanoscopy, because of its importance, especially in the study of traumatic lesions of the iris.

It is well known that the iris is composed of two principal structures, or layers; the mesodermic portion, which is easily transversed by the bundle of light no matter how much pigment is accumulated in it; and, the ectodermic or retinal layer of the iris, which on account of the extensive accumulation of pigment, is opaque to the rays of light.

Thus, when we observe the eye with focal illumination, (Fig. 1) the mesodermic layer is portrayed with its very delicate structure, columns, crypts, etc. We are even able to distinguish in some of the crypts, the brown color of the pigmented epithelium, especially in blue eyes. When a foreign body of small dimensions penetrates through this layer, the traumatism may not be sufficient to produce visible perforations. Though present, very small perforations may be easily overlooked due to the special structure of this layer which conceals them as a cryptic formation; but, when sending a bundle of light through the pupil (diaphanoscopy Fig. 5) the light is thrown back, or reflected by the lens (especially when cataractous processes are present) and the perforation in the iris is then designated because the rays of light going through the perforation, makes it appear as a bright spot on a black background.

The technique of a good examination includes the systematic application of all the methods of slit-lamp illumination in order to obtain the greatest number of details.

The advantage of the slit-lamp over other clinical methods is the possibility of observing certain details which are not visible by their use, especially, the perfect localization of a pathologic intrusion. This localization depends upon the width of the slit, which can be reduced as narrow as 50 microns; when using such a very narrow slit, a very thin section of the transparent structures of the eye is produced, similar to those obtained for microscopic study in which the exact location of the lesion is easily found. What we gain in localization is, however, lost in illumination, and to avoid this loss it is necessary to constantly change the width of the slit, thus prolonging and complicating the examination, which from the standpoint of the patient, should be conducted as expeditiously as possi-

ble, as the bright light of the instrument is quite severe.

Summarizing, a good examination with the slit-lamp requires:

1st. A systematic use of all the methods of illumination.

2nd. The use of the wide slite which permits vision of the different structures in their form and color, etc., and the thin slit, exclusively for localization.

3rd. The use of several objectives in succession, the small magnification permitting the stereoptic vision of the whole eye, and the magnification of the details afterwards, by use of an objective of a higher power.

4th. The examination to be conducted rapidly in order not to distress the patient. This must be guarded against, especially when we have to take observations every day in order to follow the progress of pathologic manifestations.

The first two essentials are supplemented by the use of proper diaphragms which eliminate maneuvers in changing the size of the slit. For the past two and one-half years, we have been using the double slit of Lacarrere, which, in our judgment, is the one which offers the greatest advantages.

This diaphragm (Fig. 7) has two slits, one angular L-shaped, one and one-half millimeters in width; and another, thinner, both of which can be reduced as much as we desire. These diaphragms make, in the eye, two optical sections, (Fig. 8) visible simultaneously, within the field of the microscope, whatever magnification is used, and by producing different surfaces of section, facilitate stereoptic vision, which is especially difficult for beginners to acquire.

The thin slit makes serial sections for localization, which are immediately analyzed by the use of the wider of the two slits which gives us the form, color, etc., and furnishes the amount of light necessary for diaphanoscopic

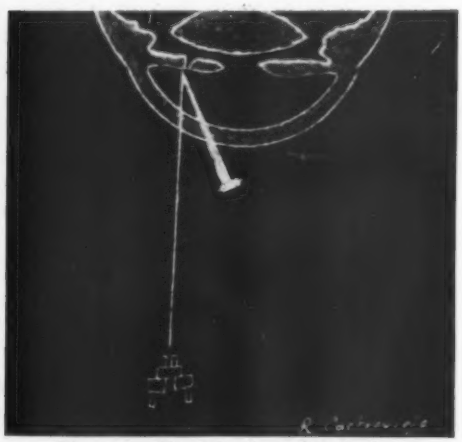

Figure 1. Direct or focal illumination.

Figure 2. Diffuse illumination.

Figure 3. Indirect or lateral illumination.

Figure 4. Oscillatory illumination.

examination. Horizontally, details can be observed on the prolongation of the L-shaped slit. By using the double slit, we obtain very demonstrative images, especially on the cornea, where several methods of illumination can be used simultaneously—focal illumination on the two slits; lateral illumination between them; diaphanoscopy on the opposite side to the incidence of the bundle of light, and by gentle lateral motion, the observation in oscillatory field of Koeppe.

The third essential of our summary is secured by the use of a mechanism analogous to that used on the ordinary laboratory microscope. Here it is furnished by the Pardo revolving objective changer, in which three objectives can be adapted in a way that improves considerably the maneuvers of changing them, and facilitates the performance of a rapid, methodic and complete examination. The statement that for our examination of the eye only one objective of medium magnification is necessary, is inadmissible.

In our service, we follow the rules dictated in laboratory work for the study of microscopic slides, performing a routine examination of our patients:—

First. By observing the slits in the eye without the aid of a microscope.

Second. Observation with at least two objectives, one of low magnification giving us a good stereoscopic picture of the whole eye, and another of medium magnification for the finer details, all of which can be executed in not longer than two or three minutes in the average observation.

Without describing the innumerable findings, now well known, by which the slit-lamp has created for itself a pre-eminent place among methods of diagnosis in ophthalmology, we will conclude our paper with the presentation of a few very demonstrative cases, in which the diagnosis was due, exclusively, to the aid of the slit-lamp.

Case Reports

Case 1. A. T., 53 years of age. April 8th, 1930. History: While working in a coal-mine, November 7th, 1929, a piece of coal struck his right eye. He was seen by several doctors, one of whom removed something from the eye. Vision was perfect for a couple of weeks, when it began to fail and the patient resorted to other doctors who gave a diagnosis of contusional cataract, but all of whom gave a negative diagnosis for an intraocular foreign body. The findings by the ordinary clinical methods were a soft, white cataract in the right eye; good perception and projection; good reaction of the pupil; normal tension. Left eye, perfectly normal. Nothing could be found to explain the formation of a cataract, except the traumatic contusion.

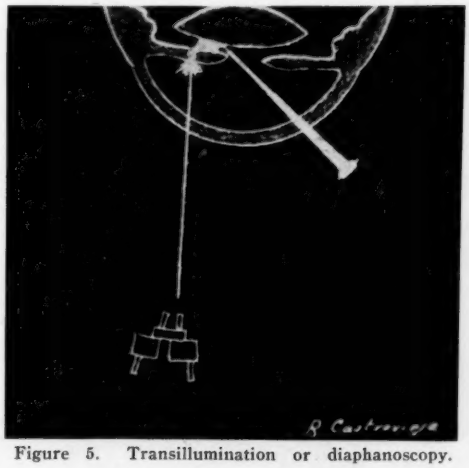

Figure 5. Transillumination or diaphanoscopy.

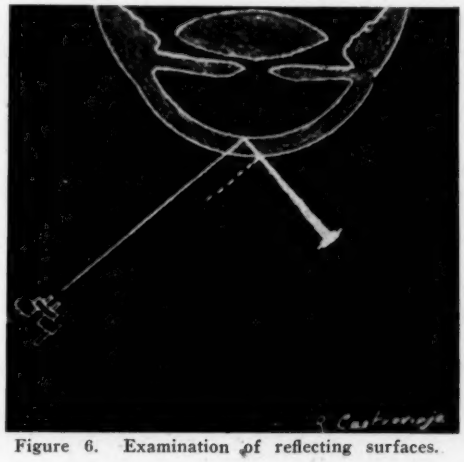

Figure 6. Examination of reflecting surfaces.

By using the slit-lamp, a perforating scar was found in the cornea, about 3 o'clock, 3 millimeters from the limbus. By transillumination, could be seen a hole in the iris, coincident with the perforation of the cornea, which caused the suspicion of a foreign body in the eye.

The pupil was then fully dilated, and a rupture in the anterior capsule of the lens could be seen in direct line with the two perforations found in cornea and iris, and, immediately behind the rupture of the capsule, a black foreign body, of about 1 by 1½ millimeters.

X-Rays were taken, all being negative for a foreign body, except those by Vogt's method which gave a very faint shadow in each of the several pictures taken. The lens was removed and a particle of coal, about 1 by 1½ millimeters came out with the cataractous mass. Patient was discharged April 28th, 1930, the vision at that time being 20/50 with a plus 10½.

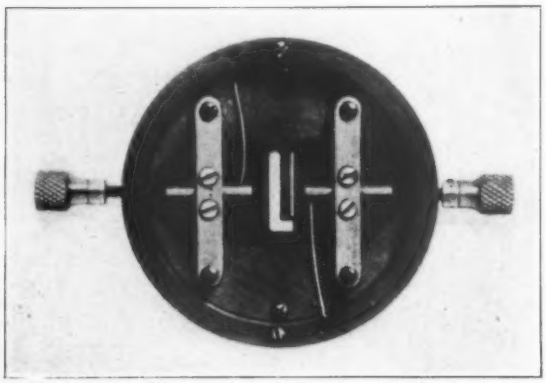

Figure 7. Photograph of Lacarrere's diaphragm of double slit.

CASE 2. A. B., 27 years old. April 7th, 1930. History: While hammering steel something struck him in the left eye. X-Rays were taken which did not show the presence of any foreign body. A few days later, the vision began to fail and one month later a complete cataract had developed which was diagnosed as a contusional cataract.

When the patient came to the clinic, Aug. 7, 1930, the diagnosis, with the ordinary clinical methods, was of a soft, complete cataract, yellowish in color. Good perception and projection; good reaction of the pupil; normal tension.

Slit-lamp: a perforating scar in the center of the pupil and a small rupture on the pupillary border, at about 6 o'clock, were discovered; and, with the pupil fully dilated, a rupture and yellowish spots of siderosis on the anterior capsule of the lens. The iris was slightly changed in color in comparison with the other eye (heterochromia iridis). Several X-rays were taken by Sweet's improved method, Krookman's and Vogt's methods, none of which showed the presence of an intraocular foreign body.

For reference about the double slit-lamp consult the book of J. Lopez-Lacarrere, Libro-Atlas de Bio-Microscopia de la Cornea, con la lampara de doble hendidura, published by Blass, S. A. Madrid, Spain, 1929.

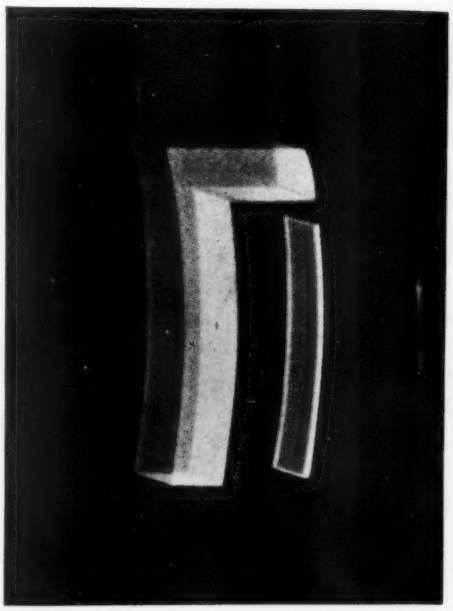

Figure 8. Goemetric aspect of the double optical section in the cornea.

This could be explained by the penetration of a very small particle of iron, totally dissolved by the ocular fluids, because there could be no doubt that a foreign body penetrated into the eye, as shown by the traumatic remains in its path through the different structures, the siderosis shown by the deposits on the anterior capsule of the lens, and the change of color in the iris.

CASE 3. C. G., 10 years old. History: Patient was struck in the right eye, two years ago, with an arrow from his brother's bow, with the subsequent development of a traumatic cataract, just after the accident. Patient was seen by several doctors who advised the family to do nothing but to let the eye alone, expecting the cataract to be absorbed in time.

The condition of the eye was as follows: Right eye, a perforating scar on the cornea, at 12 o'clock with anterior synechia, and deformity of the pupil, which is drawn upwards; the pupil is still active.

On the nasal side, near the pupil, are seen two little white points, resembling exudates; but a definite diagnosis could not be made by the use of ordinary clinical methods, even with the use of a powerful magnifying lens, and oblique illumination.

The lens was totally absorbed and the posterior capsule appeared opaque, probably due to the proliferation of epithelial cells from the anterior capsule. Vision 3/200.

Slit-lamp reveals adherence of the iris to the cornea, on the perforating scar, and the two white elements found in the anterior chambre were the bulbs of two eyelashes, which disappeared through the pupil into the posterior chamber and so appeared, toward the nasal side. Incisor of the limbus was performed on the temporal side and the eyelashes removed with Verhoff's forceps. Patient was discharged two days afterwards, the eye being perfectly free from inflammation.

Numerous other cases could be mentioned which would be only a repetition of many others published recently in ophthalmologic literature.

We again stress, however, the great importance of this medium of diagnosis, which, in comparison with the ordinary clinical methods such as oblique illumination, etc., is of greater value for the study of the anterior segment of the eye, than was the discovery of the giant Gullstrand compared with the ordinary ophthalmoscope.

We have to consider the few details which seem superficial and unnecessary, but when used in connection with the whole, co-ordinate the execution of an easy, complete diagnosis.

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Discussion

Dr. O. B. Nugent (Chicago, Ill.). The slit-lamp is the most important diagnostic ocular instrument devised since the invention and perfection of the ophthalmoscope. Its use has caused many upheavals in certain old ideas and teachings of ocular-physiology and pathology. It has brought many new names to our ocular vocabulary, given us a more thorough knowledge of certain pathological processes and has, by facilitating a more thorough diagnosis, been the means of more rapid cures of many ocular diseases.

Its widest range of usefulness is confined to the anterior segment of the eye, being the most beneficial in the study of diseases and injuries of the cornea, iris and lens. Many interesting points have been brought to light concerning both the normal and diseased tissues. In the cornea, we are able to study the conditions of the surface epithelium, corneal nerve fibers, newly formed blood vessels, irregularities in the thickness of the cornea, the endothelium which covers Descemet's membrane with its craters, folds on Bowman's and Descement's membranes, deposits in the potential lymph, spaces on the corneal stroma, film deposits on the endothelial lining of Descemet's membrane.

In the conjunctiva, the lymph spaces can be studied and the blood-vessels and their contents are readily seen. Small tumors can be measured. A study of the aqueous is permitted far beyond any other method and oncoming disease can be sensed days in advance. Living and dead cells and fibrous exudates can actually be seen in the aqueous. The depth of the anterior chamber can be accurately measured.

Anomalies of the iris have been detected in large numbers and its behavior in health and disease has been carefully studied. Conditions of the lens, likewise, have been studied, and oncoming cataracts and lens opacities have been diagnosed months before they become visible by other means of diagnosis.

Such terms as arc-line, Bedwing, catoptric, Images, Diaphane, Elschnig's perls, Fleischer's ring, flare, frill, mamelons, Hudson's brown line, imprint, Kruckenberg's spindle, Lusse's line, Roacae of cornea, Shagreen, Stahlis' line, Turch's line, Vossius' ring, Wasserpalt, etc., will soon be as common to the ophthalmologist as posterior staphyloma, colaboma, choked disc, and many other terms of ophthalmoscopic origin.

Dr. E. A. Miller (St. Joseph, Mich.): I should like to ask the essayist if it is possible for men of average ability to sufficiently familiarize ourselves with the slit lamp to justify making it an instrument for routine use in our work. As you all know, a little knowledge of a lot of these things is oftentimes dangerous. We all found that true with the x-ray. We sometimes know just enough about it to get into difficulties. I am wondering if that holds true with the slit lamp.

Dr. Ramon Castroviejo (Chicago, Ill.): In seven days you can familiarize yourself with the slit lamp. We now look at it as a practical instrument. It is recognized by everybody who uses the ophthalmoscope. The slit lamp is much more important than any other instrument. You can do almost one hundred per cent of the diagnosis, except some lesions, and these can be seen with the ordinary ophthalmoscope. That is not so with the anterior segment of the eye. Oblique illumination is very insufficient for diagnosis.

For instance, I am going to mention the cases I mentioned yesterday, in iritis. In iritis the first pathology is a vasodilatation due to toxins in the iris. This vasodilatation is not observed directly. It is observed through the aqueous humor. When you observe it with the slit lamp it looks empty and the light passes through from the lens.

ELECTROSURGICAL DESTRUCTION OF RECURRENT LYMPHOID TISSUE AFTER TONSILLECTOMY

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"The complete removal of all tonsillar tissue is necessary when the operation of tonsillectomy is performed." This statement was made by Rhoads and Dick [1] as a result of their study of tonsillar stumps which were found in the throats of 73 per cent of persons who had undergone tonsillectomy. "These 'stumps' harbor more pathogenic bacteria per gram than tonsils removed for the first time."

In spite of the competency of the surgeon and the employment of a standard technic, lymphoid tissue in the tonsillar fossae is known to recur. Whether this recurrence is the result of incomplete tonsillectomy is still disputed by some laryngologists. It is, however, a reasonable assumption. Some investigators have attempted to show that the method of removal is the cause of the tissue remains and that this tissue is so small in amount after the tonsils have been enucleated that it cannot be detected on gross inspection. Others [2] contend that irrespective of the most carefully performed operative technic or the type of instrument employed, a redevelopment of lymphoid tissue is an inevitable sequela in a large per cent of tonsillectomized individuals. On this subject, Fowler [3] states: "Recurrence of lymphoid tissue in or about the tonsillar bed is reported wherever follow-up work is accurately done. In a series of such examinations in one of the large New York hospitals several years ago, the whole fossa was clear and the pillars intact in 60 per cent of the cases. Of the other 40 per cent the majority had marked pieces at the base".

The results of two series of follow-up cases, each series running over one thousand in number, led French[3] to believe that recurrences of tonsillar tissue in the fossa can be almost absolutely prevented by careful dissection, and that the amount of lymphoid tissue below the fossa (the infratonsillar nodules) can be eliminated.

While this assertion is theoretically correct, incomplete tonsillectomies are constantly being performed. Pieces of tonsillar tissue are found in the fossae of clinic and private patients. These patients are usually victims of some systemic affections, chief among which are rheumatism, cardiac disease and nephritis. Localized symptoms of repeated exacerbations of sore throat and laryngitis are also common. The problem at once presents itself how to deal with this type of case.

Secondary removal by the dissection method is successful in finally leaving clean fossae in a certain number of cases. In an equal number a further recurrence is soon to be observed. In this latter class surgery cannot again be entertained as an indicated procedure. Some other means of removal or destruction is scientifically justified.

Surgical Diathermy

Surgical diathermy which involves the use of a high frequency current of sufficient intensity to raise the temperature of tissue beyond physiological limits and thereby destroying them is an ideal means for the ultimate removal of recurrent lymphoid tissue. Surgical diathermy[5] includes such effects as *electrocoagulation, electrodesiccation,* and *fulguration.* Electrocoagulation implies tissue coagulation, "not burning, charring or incineration." Electrodesiccation is a process of tissue dehydration. Fulguration is a sparking of tissues with subsequent carbonization.

Surgical diathermy either as electrocoagulation or electrodesiccation has been advocated by some as a substitute for surgical tonsillectomy. Experience does not warrant such a decision. There may be indications for which surgical diathermy is a preferable substitute for surgery, but it has not attained sufficient merit to be employed routinely. For recurrent lymphoid tissue it is a means which must be properly evaluated for selected cases. Two important considerations are (1) the anesthesia, and (2) the method.

Anesthesia

Any manipulation in the pharynx while not

always painful is sufficiently disagreeable to call for preliminary anesthesia. Nerve blocking may be employed, but no infiltration of fluid into the pharyngeal tissues is free from some water-logging reaction. Infiltration is not altogether satisfactory for this reason. A small amount of cocaine solution (10 per cent) swabbed on the tissue to be destroyed affords fair anesthesia. There is some discomfort, but usually this is complained of only by very nervous patients. Apothesine or butyn solution (10 per cent) will produce the desired anesthesia if applied more freely than the cocaine. As only a very small amount of the latter is used, no ill effects have been observed in a large series of cases. If desired, prior to the operation, barbital sodium, or luminal, in suitable dosage, may be administered by mouth to overcome any untoward action of the cocaine.

The Method

The selection of the electrodesiccation or electrocoagulation technic will depend largely on the experience of the laryngologist. Generally a guide is the size of the residual mass. If a large amount of tissue is to be destroyed, electrocoagulation is preferable. For small masses of lymphoid tissue, electrodesiccation is the method of choice.

Electrodesiccation is a uniterminal method, i. e. a single electrode is used which is attached to the highest voltage terminal, called the Oudin or Tesla tap-off. Its action is slower and several more applications may prove necessary than when electrocoagulation is employed. The latter is a biterminal procedure, i. e. the circuit of which produces higher milliamperage and low voltage. The circuit is completed by an indifferent electrode which is either a long metal cylinder, held snugly in the patient's hand, or a plate of block tin placed on the patient's back. The active electrode is a bent steel needle encased in an insulated holder. Punctures are made into the lymphoid tissue at a depth of from one-sixteenth to one-eighth of an inch, utilizing sufficient milliamperage to produce a grayish-white coagulation around the site of the needle. The time necessary for this is usually from one to three or four seconds. Only two to three punctures are made on one side at a sitting. Before a second treatment is given, the local tissue reaction from the first treatment should have passed off. There is usually no after-discomfort. The operation is performed in the office.

When electrodesiccation is employed, the operator must be careful of sparking from the electrode holder. This is soon learned from experience in a few cases. The machine must be set by testing the electrode on a piece of metal, usually short-circuiting it on a metallic part of the apparatus itself to determine the size of the spark. This is done with electrodesiccation because a uniterminal procedure does not permit a milliamperage meter reading and also as a safeguard against heavy destruction of tissue. With electrodesiccation a more superficial puncture and effect are produced. The tissue is dehydrated and an actual shrinkage and destruction ensue with a minimal amount of scar tissue formation.

Pillars may be retracted by glass, vulcanite or bakelite retractors. The tongue depressor is also of an insulated material, such as glass, bakelite or vulcanite, but the wooden tongue depressor serves adequately.

The gradual disappearance of the lymphoid mass can be observed at successive examinations of the throat. No attempt should be made to include too much destruction of tissue at a single treatment as the method fundamentally involves a gradual step by step process of tissue destruction without severe reaction and discomforting symptoms.

Summary

1. Complete removal of all tonsillar tissue is desirable when tonsillectomy is performed.

2. In spite of the skill of the surgeon in his use of the instrument and technic, recurrence of lymphoid tissue occurs.

3. Secondary surgical removal of lymphoid masses is sometimes successful, but just as often unsuccessful, necessitating some other means of destruction or removal.

4. Surgical diathermy, either as electrodesiccation or as electrocoagulation is a desirable and satisfactory procedure for the destruction and ultimate disappearance of recurrent lymhpoid tissue.

5. Care must be exercised in the selection of cases and the correctness of technic, for upon these factors successful results depend.

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PHYSICAL THERAPY IN EYE, EAR, NOSE AND THROAT PRACTICE

Approval Of Its Value After Eight Years' Experience

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Man's knowledge has been outlined as History, Science, Literature, Art, Religion and Philosophy. By common consent the Medical Profession is honored by a position under the heading of Science. Science is defined as knowledge, learning, skill; and Natural Science means an understanding of the causes and effects of the laws of nature.

Nature's laws are immutable; never changing throughout the centuries, and their perfection is accepted by all thinkers regardless of the age old controversy over their origin by orthodoxists and evolutionists.

The exact understanding of nature's laws, however, and the interpretation of their effects when violated is unfortunately not given to such common acceptation. And it is in this especial field that we as scientists have the great privilege, to labor to the end that as our knowledge and understanding increases, proportionately the health, wealth and happiness of the human family is augmented.

Severe critics have made the observation that true science is exact, and that since applied therapeutics cannot always be depended upon to obtain the results sought, therefore, medicine is imperfect and not an exact science; and if not exact, it should not be classified as a branch of science. If this were true only of medicine, the objection would have more weight; but many refutations could be made of the perfection of even more fundamental conceptions of basic importance, of which I will refer to only one, viz.: the revolutionary discovery of the Einstein theory, and tthe consequent modification of views hitherto regarded as fixed for all time.

If nature's laws are perfect, and their understanding by man was accurate and complete, and if man conformed his every action to them at all times, we believe that there would be little for the physician to do. At any rate, it seems reasonable and scientific to assert that the first point, if not the only point to consider, in the making of a diagnosis in a given case is that of the probability of the violation of some natural law upon the part of the patient. Were it possible in every case to discover the precise departure from the natural (disease) and to supply a correction of the deficiency and restore the equilibrium (health), I say in every case, then medicine unquestionably would have the right to be called an exact science.

It is toward this goal that always scientific medical men are working. Can this Elysian Field be attained? If there are dissenters, let me say that progress is made only by ambition and hard work. Many achievements are reached by determination and tenacity of purpose, hitherto regarded as impossible.

Seriously, such an ideal would mean the equality of the finite to that of the infinite and the most we can do is to approximate as nearly as possible that perfection. And in our efforts along this line, herein indicated, what more rational therapy than physical forces directed against physical weaknesses need we contemplate?

If bodily health, for instance, depends upon certain definite chemical constituents of the blood and one or more of these become deficient, let us replace it; but perhaps we find that such deficiency has in turn resulted from an imbalanced endocrine system. Then our

* Read before the Ninth Annual Meeting of the American Congress of Physical Therapy, St. Louis, Mo., September 8, 1930.

logical procedure is to proceed basically to restore function there.

My hope is that this ramble so far will aid the "internists" who is all the name implies, to hesitate before he condemns wholesale all physical therapy. We need the internist and his oral, hypodermic and intravenous medications. We take nothing from him, but we trust he will, for example, seek to replace blood calcium by biologic ultraviolet body radiation as an adjunct to his regular therapeutics.

Those of us who know the value of the short wave water cooled ultraviolet in sterilization of wounds and stimulation of granular reparations would be delighted in the interest of humanity to know that our surgeons are exposing all cases of infections, open sores or ulcers to this unvaluable accessory to cure. The family doctor whose tonics are only partly succeeding in cases of malnutrition and anaemia of semi invalids and those delicate children who take cold so easily and miss so much school: if he will only try the reconstructive influence of body ultraviolet. If tonsils and adenoids should be removed, dental or other surgery needed, do it first if the patient is in condition, but if not, thicken up the blood (an old expression) first with irradiation and then do surgery. Should the child from cardiac or other vital deficiency be a doubtful surgical risk for tonsillectomy, use x-ray in small doses, repeated at two week intervals, for length of time to reduce the lymphoid tissue to normal. The tonsils losing, thereby, their bacterial incubative foci and the adenoids shrinking to permit freer nasal respiration.

We believe that our general practitioner is now sufficiently interested by his results in these cases to go farther and apply solar heat in cases of sprain, neuritis and neuralgias, and diathermy in his pleurisies, pneumonias, etc.

The field is so vast that this brief paper can only suggest a few high spots, but we cannot refrain from expressing deep regret that any oculist would fail to employ, in addition to the established régime in corneal affections, short wave ultraviolet: the "cautery" which disinfects but does not destroy. Corneal injuries and ulcers require bactericidal agencies in order to prevent perforation and loss of the eye. Actual cautery accomplishes this, but with always some destruction of normal cells, thereby increasing proportionately the size and density of the resulting cicatrix. The more scar, the greater loss of vision. Ultraviolet destroys bacteria directly, and stimulates phagacytosis, an indirect sterilizing agency, without destruction of normal cells. Once equipped, the oculist will find other uses for his water cooled lamps as in eczemas of the eye lids and blepharitis marginalis.

The aurist who employs physical therapy is especially fortunate in that he has at his command a therapeutic agency which has proven its value in middle ear affections over a period of eight or ten years. Notably Dr. J. J. Richardson of Washington, has made extensive reports of the value of x-ray in deafness. This topic is so voluminous that only a word can be given to it here. Three years ago before this society I reported briefly upon my work in nasopharyngeal infections associated with eustachian obstructions and it is my purpose to publish soon a more conclusive treatment of this important subject. I may say briefly that there are thousands of cases of partial deafness in which the best specialists have pursued the established treatment to the end of its possibilities, including surgery of the highest class, in which x-ray can still farther improve the hearing or dry up a chronic seeping discharge. These cases are obstructed beyond the reach of instruments or surgery and only x-ray can penetrate to it. If the obstructive tissue is lymphoid hyperplasia of the angle of the pharynx and Fossa of Rosenmueller which approximate the orifice and extend inward along the course of the eustachian tube, and lymphoid tissue is the usual cause of stenosis, x-ray by dissolving such lymphoid tissue renders the eustachian tube patent and dry and improvement or at least an arrest of progress results. Surgery should be done in such cases, but I desire to emphasize that in my experience in many cases good surgery leaves much to be desired.

Along similar lines the laryngologist whose clean tonsillectomy often fails to entirely clear up, whose chains of cervical lymphoid glands, enlarged and infected before operation, do not normalize, will be delighted with the benefits of a follow up irradiation. Should a thyroid hypertrophy have developed during the progress of the tonsillar infection and still persists, expose the thyroid a few times while treating the lymph glands and note results.

In the matter of the treatment of the common cold of which much is being said in lit-

erature now, let me in closing enter a plea for more consideration of the general physical condition of the patient. Acute rhinitis with or without sinus infection is more frequently than not accompanied or preceded by a faulty metabolism and imbalanced blood chemistry. In fact, in many instances, the "cold" is really a local manifestation of the physical defect and in such cases local measures can do no more than palliate and general restorative agencies directed against the general derangement is the practical procedure to effect a cure. Of these, I place in first rank general body ultraviolet irradiation which by normalizing the blood stream is always useful and often of more benefit to the "cold" than local measures.

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THE DIATHERMY APPARATUS: SUGGESTION ON HOW BEST TO USE IT

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No doubt all manufacturers of electromedical apparatus receive during the year a host of enquiries in regard to problems of how best to utilize the machines purchased from the manufacturers. Space does not permit to recite some of the interesting and baffling queries that frequently arrive on the manufacturer's desk for answer. The question therefore may be asked:—"What does a physician most want to know and why is he spending his time and money in attending conventions?" "Does he want only scientific data or does he want substantial result-producing methods to assist him in the complex problems that confront him daily?"

The manufacturer has an abundance of complex scientific problems to master, but as each problem is mastered it then becomes one of mechanical and electrical design and of mechanical production.

The physician's problems are not such that he can study them, lay out a blue print and let his nurse produce therefrom uniformly satisfactory results. His problems differ so widely that a study must be made of each case. Why, then, should we ask the average physician, already overloaded with cares, to listen in to a long, dry exposition on the proper physical and mathematical relationship that must exist among the various electrical quantities involved in the designing of modern diathermy apparatus, or the knowledge of transformer ratios, leakage, reactance, condenser capacity, inductance, charging and discharging times, wave forms, trains of oscillations per ½ cycle, charging currents, gap voltages, conditions to insure smooth and efficient quenching of spark gaps, etc., etc. These, we believe, are of importance only to those responsible for the designing of such equipment.

Believing that the average physician in attendance here is in search of knowledge to assist him in the treatment of his patients, we gladly sidestep the complex, electrophysical part of the subject and offer in place of this some practical suggestions in the application of physical therapy methods.

Diathermy

(1) Develop the habit of keeping your spark points close together, using in preference a higher rheostat setting, and obtaining thus the lowest possible voltages. They are easiest and safest to apply. The danger of sparking is reduced following a case of faulty error in application, and the breaking of the circuit at the electrode is minimized. Furthermore, you theoretically obtain more trains of oscillations per ½ cycle,—a most desirable sedative effect on the nervous system.

(2) Check over your contacts, avoid the possibility of a break between cord and cord tip. See that no loose contact is made and your machine will deliver a far smoother current. *These points are too often overlooked!*

(3) Begin your treatment at low milliamperage and gradually raise the milliamperage

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by opening your spark gaps to the comfortable heat toleration of the patient or to the required setting. The reason upon which this is based is due to various kinds of tissue traversed by the righ frequency current and on the various resistances encountered by the current. Remember that where you find the greatest resistance you find the greatest heat, and such points too often are unduly heated far ahead of the surrounding tissue. A more uniform heating is always obtained when the milliamperage is gradually raised to maximum.

(4) Make it a special rule to always begin with a sufficiently heavy current so that *all* increases can be made by spark gap adjustment during any single treatment.

(5) The sensation of diathermy to the human system or part under treatment is one of heat only. The circuit is under complete control of the operator when the outfit is properly adjusted and is absolutely devoid of any faradic sensation.

(6) Too often a physician assumes something mysterious and dangerous in using diathermy current. Permit us, therefore, to set such minds at ease when we state that the modern construction of apparatus for the production of diathermy current has been perfected to a point where absolute control is obtained by the operator. The modern outfit is so *constructed* and *protected* that both operator and patient are in no danger whatever of shock or even the slightest faradism. To obtain and maintain the above condition, remember that you should preferably use more rheostat and less widely open spark gaps.

(7) Like all other electrical currents, the passage of diathermy currents depends upon the resistance offered by the tissues through which it passes. Naturally, a continual amount of heat is carried away by the flow of the blood. One must especially consider the extreme high resistance of the skin and the hairy portions of the skin. This resistance can be well overcome by an application of moist water or liquid soap or special preparations on the market. In the absence of any of these preparations one can successfully use a solution of sodium bicarbonate.

(8) If using block tin, roll it out smooth and remove humps, sharp edges and corners because these tend to depress in small areas, resulting in hot spots which are disagreeable.

(9) If mesh is used it must be clean and should be kept clean in alcohol when not in use. Never use corroded mesh. The corroded links make poor contact with one another, resulting in contact by small arcs which heat the mesh. These hot links, naturally, are undesirable, not only because of discomfort but because of possible coagulation in minute areas.

(10) Beware of moist electrodes when not applied horizontally because the moisture will flow to one end, resulting in increased resistance at the drier end. Heating will therefore not be uniform and will result in hot spots.

(11) When treating with or without special preparations, you will observe that as the heat becomes apparent, the sweat glands are stimulated to greater function. Reaction is set up producing elimination. Your contact remains intact and, in fact, improves, lessening the necessity for further attention.

(12) Too often when surgical diathermy is spoken of it is confused with the surgical tissue-cutting current. It is well to remember that surgical diathermy refers to the destruction of tissues by heat which is raised beyond the physiological limit. Such destruction is caused by coagulation, by fulguration or by dessication. The former is the low voltage method of actual contact while the latter is of higher voltage and is usually used for purposes of dehydration. Surgical tissue-cutting is accomplished not by direct contact but by establishing a small arc from an undamped or partially damped high frequency current. Time does not permit of further discussion on this special modality.

(13) In a very excellent paper by Stenstrom, University of Minnesota, published in the August (1930) issue of the *Archives of Physical Therapy, x-ray and Radium,* the differences in body resistance to direct current and the resistances to high frequency currents are dwelled upon clearly, indicating that a direct current would have to pass through all resistance as it cannot pass through condensers.

The high frequency current passes through the series resistances, but will be divided between a resistance and a condenser which are both in parallel and in series with one another.

When the resistance, the capacity and the frequency are all very high, practically all the current passes through the condenser without producing any heat there. With a frequency

of 1,000,000 per second, we can assume for a first approximation that the current passes only through the series resistances and the condensers, and we can represent the electric path through the body by a resistance in series with a condenser.

In discussing Stenstrom's paper, Dr. Kobak says, "I agree with the essayist that the general body temperature is raised very little with ordinary diathermy. It is usually sufficient for the purpose it is employed. If we remember vant Hoff's law that a 10° C. rise in temperature is usually sufficient to produce a double or treble increase in the physiological reaction of the tissue, we must conclude that it does not take very much temperature to set up a physiologic response."

A further discussion by Dr. Ewerhardt brings out the following: "In speaking on the subject of frequency the author gives it as his opinion that there is no essential difference between the frequency of the region between 300,000 to 3,000,000. As we all know, this question of frequency has been a debatable one for some time; some telling us that a higher degree of heat production is possible only by virtue of a relatively high, others a relatively low, frequency. Others tell us that it is not primarily the oscillation frequency which determines the heat production but that the spark frequency is the important factor. Again, there are some who are of the opinion that heat production is but the end result of the application of a high frequency current through tissue. Again, we are told of the probability of a selective effect of the current upon cell tissue in accordance with the principles of natural protoplasmic vibration. Professor Stenstrom, as you have heard, dwells instructively on all of these factors. Concerning the latter he says: "So far no other effect has been detected than the heat production. The possibility of direct chemical effects cannot be denied, but they seem improbable, and there is no doubt that it is the heat that sets a limit for the current."

In summing up, one should always bear in mind that at least two factors enter in the electrical effect of diathermy applications. One, the degree of heat maintained and, second, the length of time of treatment. One should also remember that chemical activity increases with every rising temperature—that pain wherever located is relieved by the production of hyperemia on the surface or in the deeper parts—that it heats from within the tissues and is not conducted from without. Medical diathermy when properly applied should always be soothing and at no time should it become irritating to the patient.

One should also remember the trend of treatment today points to longer periods of application. Too often electrodes are removed during the period of increasing congestion, preventing the full reaction which would follow with its desired result, namely, drainage of waste products from the affected area.

The Action of Large Doses of Vitamins in Experimental Infection. Pfannensteil and Scharlau. *(München. med. Wchnschr. 1930,* **77**, *619.)*

Report the results of a series of about 200 carefully controlled experiments in which they sought to determine whether or not the use of fairly large doses of vitamins, singly or in combination, was capable of influencing the course of experimental infections in animals. They tested these agents upon rabbits infected by tubercle bacilli of known virulence, upon rabbits similarly infected after previous partial immunization and upon skin infections in rabbits produced by the injection of hemolytic staphylococci. The vitamins employed were D, as represented in irradiated ergosterol; B, as obtained in dried yeast or yeast extract and A as obtained in cod-liver oil. The results of these experiments showed that the administration of relatively small doses of ergosterol with large doses of dried yeast exercised marked therapeutic action, shortening the course of the infection, promoting healing and, in the case of tuberculosis, preventing spread of the disease. The combination of vitamin D with calcium and to a lesser extent the administration of vitamin D alone notably diminished the inflammatory reaction following the inoculation of staphylococci. On the other hand, vitamin B and vitamin A promoted the healing process although it had no influence in diminishing the local inflammatory reaction. Suggestive results have been obtained by the authors in a few instances in which they have applied the same methods of vitamin therapy in man.—*Am. Jour. Md. Sc.,* **180**:*725 (October) 1930.*

REPORT OF A NEW PELVIC DIATHERMY ELECTRODE *

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During the past few months our studies in pelvic diathermy, conducted by Drs. Royston, Ewerhardt and the writer, has directed attention to certain valuable points that, we feel, have quite a bearing on the future use of deep-seated heat in the pelvis. The general technique and preliminary report of a series of cases was presented before the Washington University Medical Society, May 12, 1930, and was published under Washington University Clinics in the *Missouri State Medical Journal* for July.

It was believed that a vaginal expanding electrode, which by nature of its construction, more nearly approximates the tubo-ovarian adnexal regions, would be of decided value in more direct passage of high frequency current through this area. At an earlier time, Zener, while working with us, showed the advantage of a vaginal-cervical compressing electrode.

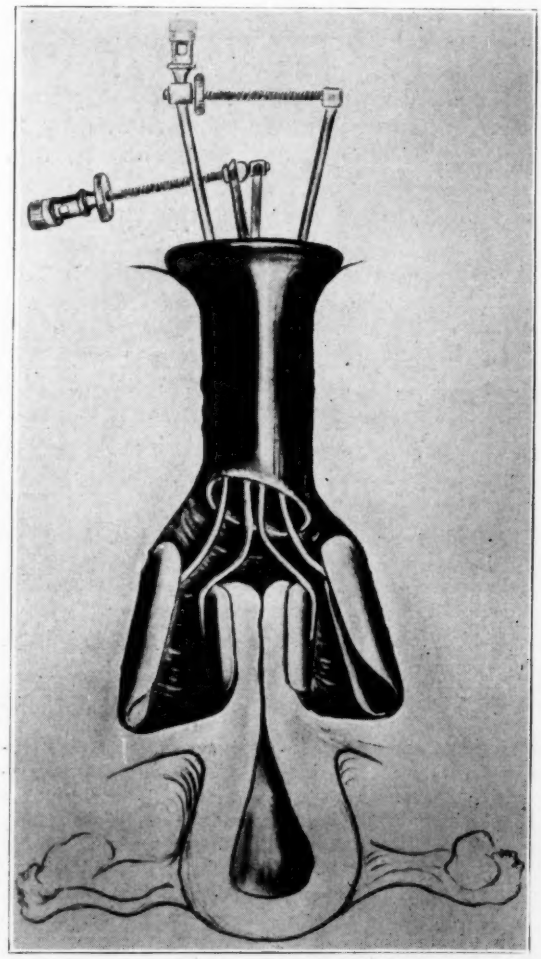
After several attempts a combination vaginal expansile, cervical contractile electrode was made, of simple design, which enables us to pass a much larger amount of high frequency current through the pelvis than heretofore possible. We feel that the cervical canal temperatures very closely approximate the adnexal temperatures. This new electrode has been in use during the past two-and-a-half months and has proved itself a material advance in diathermy technique.

At the American Congress of Physical Therapy, which met at the Hotel Jefferson, St. Louis, September 8-12, 1930, the author, as a part of the discussion of Dr. Gellhorn's paper on pelvic diathermy, showed some lantern slides describing this new diathermy electrode.

Description of Electrode

A hard rubber or Bakelite hollow, cylindrical, vaginal speculum, of the Ferguson type, is fitted with four similarly curved blades. The two outer vaginal expansile blades may be expanded laterally and are so shaped that when in the closed position for introduction of the electrode, the total outside circumference and general contour is the same as that of the cylindrical speculum. These two outside blades when expanded are shaped to conform to the vaginal fornix and cul-de-sac, so that they may approach both adnexal regions to the greatest possible extent. There are two cervical contracting blades that fit inside of the lateral, vaginal expansile blades. These blades have the same general curvature and when in position for vaginal introduction fit snugly inside of the two lateral blades.

The mechanism of operation of the two outside blades and the operation of the two



inner blades is accomplished by the simple means of having each blade mounted on a steel rod, which in turn is hinged at a suitable point on a round metal collar which fits snugly into about the central portion of the hollow cylindrical speculum. These four blades are

* Received for publication, September, 1930.

mounted on their respective four rods, which are so curved that when the instrument is placed open in the vagina, there is central passage-way through which a thermometer may be passed directly into the cervical canal.

The rods of the two lateral expansile blades are mounted, hinged, on one collar in the cylindrical speculum at a fixed point in the speculum, while the rods of the inner cervical contracting curved blades are mounted on a separate metal collar in the cylindrical speculum. This latter mounting has a ball-and-socket joint on the collar and the collar itself is permitted an in-and-out sliding play of a short distance within the cylindrical speculum. This feature enables us to get a more correct anatomical placing of the inner contracting blades on the lateral aspect of the cervix uteri.

When the instrument is in place a thermometer passed down the central canal of the cylindrical speculum finds its way directly into the cervical canal.

It is obvious that compressing the rods of the lateral blades at the external opening of the cylindrical speculum would cause the lateral blades to expand, and in like manner the spreading of the inner rods would cause the inner contracting blades to contract. The desired position is maintained by a thumb-screw which works on a screw threaded connecting rod. Each connecting rod is fitted with a binding post. A split Y-shaped wire is used with this electrode. The passive or disbursing electrode that we are using at the present time is an abdominal belt of block tin, with taped edges to avoid sharp contacts with the iliac crests or lower costal margins.

It will be seen from the description of the new electrode that a direct electrical contact is afforded to the four blades, thus boiling the instrument can produce no obstructive corrosion, as the electrical current does not pass through any joints. We have found marked current leak and subsequent heat loss due to corrosive joints. This new instrument is easily placed in the vagina and when adjusted for use is self-retaining. Only slight experience is required to "get the feel" of bringing the inner curved blades against the cervix. With this new electrode the cervix and uterus, tubes and ovaries, and cul-de-sac are heated more uniformly than heretofore. Cervical temperatures of more than 110° may be easily obtained but are not desirable.

By using the Bakelite, or some such suitable non-conductor, as a sort of cylindrical vaginal speculum, there is no possibility of the current being shunted or short circuited over the vulva and perineum and thus take the skin-muscle fascia route to the abdominal belt, which takes place unless adequate insulation of the introitus is maintained.

Die Bedeutung Der Heilquellenbehandlung Fuer Die Innersekretorischen Erkrankungen. (The Importance of Medicinal Spring Treatment for Endocrine Diseases). H. Vogt.

Med. Welt, 1930, Jg. 4, Nr. 15 (April) p. 519-523.

The practical importance of mineral water treatment of endocrine affections is of direct value in the treatment of essential hypertension thyrotoxic affections, climacteric conditions, a number of nervous diseases due to changes of the tone of the vegetative nervous system, and indirectly to a number of pluriglandular disturbances. The mud treatment of climacteric complaints and the carbon dioxide treatment of diseases of the thyroid gland can be directly attributed to electrolytic changes. In hypertonic conditions it is an old experience that the action of carbon dioxide baths is an arbitrary one, i. e., it varies in effect from time to time. The change of the peripheral electrolyte concentration due to bath treatments modifies or sharply reduces the hormonal increase in blood pressure by the alteration of the ion economy, which creates another sphere of activity for the hormone. The author believes it probable that the remedies of springs and mud bathing can in some way be utilized in definite conditions of endocrine diseases.

Herz Und Kreislauf Bei Hypertonie. (Heart and Circulation by Hypertonia). N. Jagic.

Wien. klin. Woch., 1930, Jg. 43, Nr. 11, (March), p. 336-337.

Treatment of heart hypertonia requires first of all that the heart and circulation be spared and above all that angiospasms be avoided in order to prevent further increase in hypertonicity. The avoidance of psychic excitements, bodily overstrain, excessive supply of liquids and heavy meals play an important part. In regard to medicinals theobromin preparations decreases the blood pressure and acts as a sedative. In painful sensations and paresthesias located in the course of vessels diathermy often exerts good effects. Direct therapy of the cardiac and aortic regions should preferably be avoided, as there sometimes occur untoward by-effects. Here it is better to substitute mercury vapor quartz light treatment for diathermy. Bleeding is also a convenient method of sparing the heart. As to balneo therapy the author points out that as far as his experiences go carbonic acid baths are for the most part ill tolerated. He recommends warms baths mixed with pine needle extract or oxygen baths.

A New Method of Preparing Diathermy Electrodes for the Head and Neck. Frank J. Novak, Jr., M.D.

Clinical Medicine and Surgery, November 1930.

"There are certain requirements for electrodes used in diathermy, applied to the region of the head and neck, which those on the market, in the experience of many, do not meet. These requirements are stability, comfort and good contact. After much experimentation, Novak has devised the following method for preparing electrodes.

"The materials necessary are:

1.—"S. S. White Quick-Setting Exact Impression Compound."

2.—X-ray foil, 0.005 inches thick.

3.—Small basin of hot water; pair of scissors; ordinary pocket knife; short, wooden-handled screw driver; some small metal cup-hangers; a length of plain black garter elastic, preferably about ¾ inch wide; one small eyelet punch; a box of eyelets; and an alcohol lamp or small Bunsen burner.

One cake of impression compound is usually sufficient for any electrode used about the head or neck. This is dropped into the basin of hot water, at about 130° F. This softens the compound within a few seconds and it is then placed over the area to be treated and slight pressure applied until the compound conforms exactly to the surface to which it is being applied. A cold towel is applied while the compound is in good contact with the surface, to stiffen it, after which it is removed with some care to prevent distorting it. It is dropped into a basin of cold water, where it "sets" immediately. The mould is then wiped dry and it is applied again to the skin, to see that there has been no distortion incident to removing the warm compound from the face.

"If the fit is perfect, the next step is to cut out a piece of x-ray foil, conforming exactly to the size and shape of the area to be treated. This foil is next laid upon the compound mould and smoothed over the surface with the thumb.

"The next step is to attach the metal to the compound, which is done by heating the screw driver considerably less than red hot and running it rather rapidly over the edge of the x-ray foil. This melts the compound directly under the foil and will cause the metal to adhere securely to the compound. Then the heated screw driver is pressed over the surface of the foil, attaching it more firmly throughout its extent. When this is completed the mould is again plunged into cold water to chill it thoroughly. The fingers are passed over the surface of the mould and it will be found that a small ridge of compound surrounds the metal. This is easily scraped off with the thumb or some suitable instrument.

"The two cup-hooks are now attached to the back of the mould. In order to do this satisfactorily, a small piece of compound is softened in hot water and formed into a small cone or pyramid with a flat base. This pyramid is cooled in water to harden it, is picked up with a pair of forceps and the base held at the edge of the flame for a second, until it just begins to run. It is then immediately brought in contact with the back of the mould and allowed to harden. The second piece is attached in the same manner. The screw cup-hanger is held in a forceps and heated to a point where it is less than cherry red. The screw is inserted into the tip of the pyramid and immediately chilled with cold water. The other hook is attached in the same manner. The electrode is now completed and is ready to apply to the part to be treated, there to be held in place with the elastic.

These are the necessary precautions:

"The water that is used to warm the compound should not be over 130° F., else it softens the compound too much and it adheres to the fingers, making it difficult to work. Moreover, the unnecessary heat of the compound is uncomfortable for the patient.

"In removing the mould from the face, while it is being prepared, considerable care should be taken not to bend or to distort it in any way. This is readily learned after one or two attempts. In determining the place where the hooks shall be placed on the back of the electrode, it is well to estimate this by placing the two index fingers on various portions of the electrode and thus ascertain where the pressure with the two fingers establishes the best contact. These points are marked and the hooks placed there.

"Once an electrode has been made, let us say, for the maxillary sinus, it can be adapted to succeeding cases, merely by dipping it into water of about 100° F. and adapting it to the new patient's contours.

"These electrodes can be scrubbed with soap and water and can be kept perfectly clean.

"The method of application involves necessary good contact between the metal and skin. This is obtained by holding the electrode in place with garter elastic. A length sufficient to pass around the head, with three or four inches to spare, is adequate. With a suitable eyelet-punch, a sufficient number of eyelets are placed in the elastic, about one-half inch apart. The purpose of this is to permit proper adjustment.

"A very small wisp of cotton is spread over the metal of the electrode and moistened with salt solution. The electrode is then placed in position. The eyelet at one end of the elastic is slipped over the cup-hook on the electrode; is passed around or over the head, as the case may be, and an eyelet at the other end is slipped over the other cup-hook. The elastic must be manipulated into the best possible position on the head to secure even contact of the electrode. The tension of the elastic is controlled by moving forward or backward one or two eyelets.

"When the electrode is firmly and comfortably attached, the wire leading from the diathermy apparatus is connected by slipping the end of the wire (usually in the form of a hook) through a small hole in the piece of x-ray foil which protrudes beyond the edge of the electrode.

"If the electrode has been properly made and carefully applied to the part, the patient is perfectly comfortable and at ease. Movements such as sneezing, coughing, turning the head and so on can be made without disturbing the contact of the electrode."

QUERIES AND CLINICAL NOTES

Q. Give the details of Leduc's classical experiment which explains to some degree the reasons why good results were obtained in the treatment of local septic affections by zinc ionization?

A. Friel, in his *Notes on Chronic Otorrhea*, gives the experiment thus: "Into a glass cell containing serum, wires of iron, copper, and zinc were dipped, which were connected in turn to the positive pole of a source of electric supply. Another wire which was connected to the negative pole was also dipped into the serum. When the current was turned on it was seen that from around the iron wire a dense fluid sank to the bottom of the cell. Around the copper wire a coagulation of the albumin took place, but the coagulation was not firm, and on tapping the vessel it could be detached; whilst around the zinc wire a coagulation was also formed, but it was *firm* and adhered to the zinc, and if the zinc wire was lifted up the coagulation could be lifted up with it out of the fluid."

Q. Is Surgical diathermy of value in the treatment of furunculosis of the nose and face?

A. This question is asked undoubtedly because the nose and face are dangerous regions for furunculosis. There is danger of thrombophlebitis in the veins, and a spread upward to the cavernous sinus by way of the ophthalmic veins, obviously points to the hazards with which one is constantly confronted when managing furunculosis in this region. While there are definite surgical principles to be observed, particularly that of over-active interference, attention has been called recently to the improved means of treatment which surgical diathermy offers. Dan McKenzie writes on this subject as follows: "At any stage in the evolution of a carbuncle, wherever situated, its progress can be arrested by inserting an electrode at the core and passing through it a coagulating current. In this way, the infective slough that forms the focus of the furuncle is transformed instantly into an aseptic slough, while the infected tissues around it are partly coagulated and partly sterilized. A rapid subsidence of the inflammation and cure of the wound follow.

"Further, as the diathermy destroys the organisms that give rise to the furuncle, the likelihood of a succession of boils is thereby reduced.

"The application is painful and necessitates a general anesthetic, but nitrous oxide anesthesia is quite sufficient. It should be made as early as possible in the course of the furuncle. If it is delayed until the core is surrounded by pus, a scar will be left which will take some time to disappear."

Q. What are the main facts concerning sterilization by ultraviolet rays?

A. The following quotation from Ellis and Wells' book, *The Chemical Action of Ultraviolet Rays* appears to give the most authentic resume of the subject. "It has been known for nearly half a century that the ultraviolet rays are capable of killing low organisms, such as bacteria, but it is in only comparatively recent times that this knowledge has received practical application.

"The following summary gives the leading conclusions on which workers are in substantial agreement, and a consideration of it will assist the reader in following the sometimes devious ways by which these conclusions have been reached.

"1. The bactericidal action is practically confined to the middle ultraviolet, i. e., to the region between wave lengths 2970 A. U. and 2100 A. U. The extreme limits under consideration in this chapter are 3500 A .U. and 1850 A. U.

"2. The usual photochemical laws apply: The active rays are those which are absorbed by the body acted upon: the total effect is a function of the intensity of the radiation and of the time during which it acts.

"3. The action is a direct one of the rays upon the bodies of the bacteria, and is not due to the formation of germicidal substances, such as hydrogen peroxide.

"4. The action is exerted, chiefly if not entirely on the protein constituents of the bodies of the organisms. Within the protein

molecules there is strong reason to believe that it is the aromatic amino-acids that are specifically attacked.

"5. The penetration of the rays into organic matter is extremely feeble. They are, for example, arrested by the thinnest layer of skin. As a corollary of this, turbidity of a liquid greatly obstructs the sterilizing action, while color is not of so much importance.

"6. Free oxygen is not necessary to the action."

Q. Ultraviolet is spoken of as having two kinds of action. What are these?

A. Because of lack of a standard terminology and accepted descriptive terms, no two authors classify the actions of ultraviolet in the same way. The different actions are exerted by rays from regions of different wavelengths and the two commonly recognized actions are termed *stimulative* and *lethal*. Frequently these effects are referred to as *biologic* and *abiotic*. Stimulative action is exerted by the ultraviolet from the limit of the visible spectrum to about 2900 A. U. Lethal action is produced by the rays of wave-lengths shorter than 2900 A. U.

Q. Has any progress been made in the treatment of Alopecia Areata with ultraviolet rays?

A. A recent article on this subject was abstracted in the *J. A. M. A.* issue of July 26, 1930. (It appeared originally in the *Gazz. d. osp.* April 6, 1930). The author, Narducci, reports the results secured from the use of ultraviolet rays in the treatment of 25 cases of alopecia areata. In 17 cases a complete cure was effected after from 16 to 35 exposures. Four cases showed no improvement after from 10 to 35 irradiations. In one case a bald spot that existed at the beginning of treatment became covered with a new growth of hair after a number of irradiations, but two new bald spots developed that were not influenced by a continuation of the treatment. In one case the treatment was interrupted after marked improvement. In two cases the treatment was soon given up (after seven or eight irradiations) without any improvement. Twelve of the patients had only one bald spot, while six had two bald spots. Of the four cases that showed no improvement, one presented multiple bald spots, one three bald spots, one two bald spots, and only one had a single bald spot. The author does not wish to contend that general ultraviolet irradiations constitute a specific or even the best means of treating alopecia areata, but that they deserve to be kept in mind when other methods fail, and are always a good adjuvant in convalescents, along with other local and general treatment.

Q. What is the present status of ultraviolet irradiation in pulmonary tuberculosis?

A. This question comes up repeatedly, and probably rightly so, because of the diverse opinions which have been expressed. The work of J. O. Murray, reported in the October issue of *The British Journal of Actinotherapy and Physiotherapy,* covers the question. His opinion is similar to those of others that ultraviolet must be used cautiously in pulmonary tuberculosis and may even prove troublesome. "Febrile occurrences were, to say the least, troublesome. In addition to this overheating under exposure, it must be remembered that the products of the tissue destruction or stimulation are thrown into the circulation of a defensive mechanism which in these patients is already overtaxed by the products from bacterial growth. It was found that burns were more easily produced in these patients, and also that pigmentation was slow in development, irregular in distribution, and lacking in uniformity.

"While complete failure of actinotherapy in this form of the disease cannot be recorded, it is felt that the results of a santaorium régime are much more satisfactory. For this reason we prefer to admit all our pulmonary patients to sanitoria where they receive minimal doses of ultraviolet light and maximal doses of fresh air."

Q. Does ordinary radiant energy penetrate living tissue?

A. This subject was elaborated upon in the *Proceedings of the Society for Experimental Biology and Medicine,* January 1930. The author, R. S. Danforth, performed experimental work which is described in the following abstract (B. J. of A. and P., Oct. 1930). The penetration of radiant energy was tested through the cheek by means of a spectograph and photographic plates, the extent of transmission being determined by comparing exposures made by a 15-watt electric light bulb placed 5 mm. in front of opal glass with ex-

posures made by the bulb inside the mouth. It was found that wave-lengths longer than 15,000 A. U. or shorter than 5,400 A. U. showed no detectable transmission through the human cheek. Between these wave-lengths the percentage transmission rose to a peak at a wave-length of 11,500 A. U., at which point the transmission was about 21 per cent. No measurements were made of the energy reflected by the epithelium inside the cheek, but, on the basis of Sonne's finding that about 35 per cent. of the energy striking the skin is reflected, it may be assumed that about one-third of the energy entering the cheek passed through. These studies then indicate that living tissue is generally impermeable to all but the narrow band of ordinary radiant energy lying between 6,000 and 16,000 A. U., with a maximum penetration at 11,500 A. U. What physiological or therapeutic effects such radiant energy has is still largely undetermined.

Q. What are the pathological effects of ultraviolet rays on the eye and what is the treatment?

A. This subject is considered in various texts on ultraviolet. While writers warn against the rays, so far as the eyes are concerned, frequent cases occur in which much discomfort is caused due to careless technic in wearing glasses or covering the eyes while being exposed to the ultraviolet rays. A recent article by Lear (*N. Y. State J. Med.* 29:1270, Oct. 15, 1929; abst. *J. A. M. A.*, 93:20:1595, Nov. 16, 1929) is of interest. "Lear asserts that the ultraviolet rays are capable of producing a definite pathologic condition of the eye called "photo-ophthalmia". There is a definite period of latency between the time of exposure and the onset of symptoms. A certain definite amount of these rays is capable of producing the pathological condition in a one or liminal dose or in fractional or subliminal doses, the sum total of which should equal one continuous or liminal dose. The onset of the symptoms are first itching, then pain and photophobia. It is proved definitely, clinically as well as experimentally, that the parts of the eye involved are the conjunctiva, cornea, iris and lens. Whether the retina too is affected by these rays is not definitely established and remains to be determined by future observation and experiment. As regards the treatment, the ordinary treatment of conjunctivitis such as silver nitrate or zinc sulphate will aggravate the condition. The most gratifying effects are obtained from the immediate installation of a suitable cycloplegic, preferably homatropine, with cold applications, and the wearing of smoked glasses against strong rays of light."

Q. Are physical methods of value in the treatment of leucoplakia of the non-syphilitic variety?

A. The literature contains articles for and against physical methods. Eller and Anderson (*J. A. M. A.*, Feb. 8, 1930) condemn radium, x-rays and radium for this affection. On the other hand, Broeman considered radium of value, having treated numerous cases. While the results were not perfect, they compared favorably with other methods employed. According to Broeman (*W. Va. M. J.*, July 1930) the treatment is the combination of the hard *gamma* rays, with one-half hour of a non-filtered plaque. The small patches, difficult of access, can also be treated with the galvanocautery or electrodesiccation.

Q. What is the status of radium and Roentgen rays in the management of carcinoma of the rectum?

A. Bowing, Fricke and Smith (*Radiology*, 1929, 13, 443) report the results in 127 cases of malignant disease of the rectum treated with radium and Roentgen rays. The majority of the cases were inoperable, due to the size and extent of the primary lesion, or local metastasis, metastasis to important viscera or patient's poor general condition. Adenocarcinoma of moderate malignancy predominated. Twenty-three per cent of the patients lived from three to six months, 18 per cent from six to nine months, and 34 per cent longer than nine months. Almost 4 per cent survived eighteen to twenty-four months, and slightly less than 3 per cent lived twenty-four months or more. The writers regard it as evident that the lives of these patients were prolonged and that the activity of the disease was reduced thus diminishing distressing complications. Improvement noted consisted largely in lessening of rectal discharge and pain, reduction of the size of the tumor and cessation of bleeding.

ARCHIVES of PHYSICAL THERAPY, X-RAY, RADIUM

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E D I T O R I A L S

ELECTROSURGICAL EXTIRPATION OF THE TONSILS AND RECURRENT LYMPHOID TISSUE AFTER TONSILLECTOMY

Electrosurgical extirpation of the tonsils is coming to the fore on a rational basis. The method has attracted wide prominence and considerable investigational work is now being done. While Nagelschmidt as far back as 1913 attempted to show that electrosurgery is true surgery, this belief is only now gaining recognition.

Two important contributions to the current medical literature prompt this editorial, although the tonsil problem has been repeatedly elaborated upon in these columns. No new views are expressed, and, in an article by Sponsler,[1] no conclusions of any great value are drawn. Silvers'[2] paper is comprehensive. Its main contribution is the classification of cases under distinct indications. This has never been done so specifically, and, probably, for this reason has never been fairly evaluated. Silvers' case reports are grouped under the following indications: *Hemophilia or Blood Dyscrasia, Senility with General Debility, Usually Accompanied by Chronic Progressive Auditory Changes and Deafness of Varying Degree, Cardiorenal Disease, Markedly Hypertrophied and Diseased Tonsils, the Patient Fearing and Refusing the Orthodox Operation,* and *Diabetes.*

That this grouping is not classical need not be apologized for, since it covers the ground comprehensively. Sound effort is appreciated on the part of the author in his desire to employ a uniform nomenclature. This is always a difficult problem, but was solved in this instance by following the terminology of one writer.

There is still much to be hoped for in the perfection of technic of electrosurgical methods in general, but for tonsils, certain procedures individually improved upon, from time to time, have worked out quite satisfactorily. Now is no period to argue the superiority of electrosurgery of tonsils over orthodox meth-

ods. The laryngologist is not interested in this comparison but rather in the indications and scientific application of the technic. These he has been trying to acquire by way of the rear door, and having produced results beyond expectation, he is now ready to tender the facts to the profession. Fortunately, there are some men in the speciality of laryngology who are willing to stand by their achievements regardless of general opinion. Although not meriting it, Silvers unquestionably will be subjected to criticism for stating: "Surgical diathermy enables one to remove only that which is detrimental, rapidly or slowly, depending entirely on the desires of the patient and the indications at hand; with the proper technic it makes a bloodless, almost painless and absolutely safe procedure out of one that has too often, unfortunately, proved otherwise."

To conclude that the electrothermic technic has a definite place in rhinolaryngology will also, no doubt, be assailed. Frankly, those who are most prejudiced are the uninformed. Yet, in spite of propaganda tending to sway the majority, accomplishments point to an awakening on the subject. The specialist is beginning to realize that the newer procedure offers even greater possibilities than was at first anticipated. Surgery has not met the principles of complete eradication of all lymphoid tissue after tonsillectomy has been performed. Silvers remarks that modern medicine emphatically supports the principle of eradicating all foci of infection. Laboratory workers have proved this principle to be correct. When either an incomplete tonsillectomy has been performed or a recurrence of lymphoid tissue in the tonsillar fossae has resulted from some other cause, surgery serves only partially in correcting the condition. Electrosurgery is the modern treatment of choice and experience warrants its acceptance as a procedure which has been established on a sound scientific basis.

By means of electrosurgery lymphoid remains can be extirpated.

Hollender[3] very aptly points out the superiority of this measure over cold surgery. He concludes that while secondary removal of tonsils and lymphoid pieces in the tonsillar fossae are successfully performed in a certain number of cases, there remain those in which surgery cannot again be entertained as an indicated procedure. Some other means of extirpation is scientifically justified. Electrosurgery has filled the gap. That this destructive element is not without dangers has been shown by Skillern.[4] It requires as much skill and knowledge of the part as would be required in the orthodox surgical procedure. True, the method is time-consuming. It is, nevertheless, certain, and, in the hands of the trained, can be utilized without the numerous inconveniences usually thrust upon the patient for secondary surgical operations.

There is no dispute among fair-minded surgeons that electrosurgery falls far short of being a panacea either for tonsils or for other indications. As a modern achievement it has demonstrated its usefulness and scope. The enthusiast who sees in electrosurgery of tonsils a means for quick capitalization cannot be respected. If he does not take on electrosurgery he will pursue some other means which promptly appeals to a gullible public prejudiced against surgery in general. Let the zealous investigator continue in his efforts to place electrothermic methods on the high plane which it merits. The recent scientific contributions dealing with electrosurgical extirpation of tonsils and recurrent lymphoid tissue in the tonsillar fossae are suggestive of final rationalization of a method which modern laryngology has looked upon skeptically for more than a decade.

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OBITUARY NOTE

It is with deep regret that we recently learned of the death of one of our fellows, Dr. J. E. Schoonover of Salem, Ill. Dr. Schoonover passed away on April 9th of this year. The Congress takes this means of expressing its sympathy to his family.

PHYSICAL THERAPY IN ANGINA PECTORIS

A number of foreign contributions have appeared during the current year calling attention to the value of physical measures in the treatment of cardiac disturbances. Hardly any department in internal medicine is at present in greater need for newer inspirations than that related to the therapeutics of heart disease. Investigations in this branch of medicine are not lacking in activity, but the yield has been fairly meager. The management of the cardiac patient has in no wise been changed in recent years although the statistics point to an increase in the morbidity and mortality of these sufferers. This chapter in modern medicine has the somber coloring associated with failure.

In the majority of instances the method of investigation in this as in other affections has been by the "trial and error" route. The patient directly or indirectly has, unfortunately, been the innocent pawn. Experience has thus far shown that a "specific" drug or a pharmocologic preparation lies, if at all, in the recesses of future discoveries. It is, however, inevitable that where the darkness is greatest we usually seek light in other directions; where the cul-de-sac is deepest we usually seek extrication by any other convenient exit. In lieu of this situation it would appear logical to direct attention to other measures that offer a certain amount of proof of success.

Modern physiologists are now contributing scientific reasons for the clinical proofs that have been advanced in regard to the beneficial effects produced by physical measures. A recent editorial in the Journal of the American Medical Association [1] cogently reviews some of the contributions with reference to "protective devices for the heart". It points out the relationship of glycogen and nutrition, oxygenization, anoxemia and the regulatory functions as expressed "in the conflicting manifestations of acceleration and inhibition." The conclusions to be drawn from its discussion are that the normal balance depends upon factors that regulate the nutritional and neurosympathetic status.

Reviewing the effect of physical agents in angiospasms of the heart and circulatory apparatus, Jagic [2] is convinced that "treatment of cardiac hypertonia requires first of all that the heart and circulation be spared and, above all, that angiospasms be avoided in order to prevent the further increase in hypertonicity". His treatment consists in regulating all physical, psychic and dietetic provocative factors, and the early institution of sedative and depressant medicinals, such as luminal and theobromin. In regard to "painful sensations and parathesias located in the course of vessels diathermy often exerts good effects." Singularly, Jagic stands practically alone in his objection to direct therapy in these conditions. His experience has apparently been unfavorable and he bases his objection on the untoward by-effects that he has encountered. Since details are lacking in regard to the technic utilized by him, it is profitless to speculate upon this further.

Schurig [3] has independently arrived at a more optimistic conclusion based upon his experiences with "Electric treatment in cardiovascular diseases". He feels that "electrical treatment exercises an exceedingly favorable influence on the functions of circulation. It often relieves the most tormenting complaints, promotes rest and good sleep, and strengthens the heart muscles. . . . A definite heating of the heart can be achieved by diathermy current to produce dilatation of the cardiac vessels and where a better blood supply of the heart is desired. Consequently, this current is of value in myocarditis, angina pectoris and in all affections associated with feelings of oppression." Speculation need not be stretched very far to appreciate the direct connection between the findings of the experimental physiologists and the relief obtained by an agency that can promote an increase in the local circulation of the heart. By the same token it follows that on the principle of increased nutrition both the powers of oxygenation and metabolism would be improved and the state of vessel spasm and muscular irritability reduced.

A further clinical contribution regarding certain physical measures in cardiac disturbances has been recently reported by Freund.[4] Blistering ultraviolet dosage was found by him to be an effective means in the relief of anginal spasms. His conclusions, drawn from

conservative observations on a group of cases suffering from stenocardiac complaints, is that intense ultraviolet irradiations from a mercury arc in quartz lamp gives relief to patients suffering from angina pectoris. The intense erythema is indispensable in the success to be achieved "with which it is advisable to combine a simultaneous irradiation by the Soluxlamp or Nitro-Osrom-lamp. The moderate annoyance the patients endure by the 'sunburn' for some days, plays no significant part as compared with the favorable action on their stenocardiac difficulties. The mode of effect of the irradiation is certainly to be explained by congestion of the cutaneous vessels and probably by other as yet unknown effects".

If, as has been hinted, the management of heart disturbances has reached a therapeutic impasse, the profession is now justified in adopting other measures—measures that have also been tested by trial and error and not found wanting.

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BOOKS AND WRITINGS ON PHYSICAL THERAPEUTICS—A WORD OF WARNING AND SOME SUGGESTIONS

During the past ten years numerous books on physical therapeutics have come from the press. American and English authors who have pursued the newer science have seen fit to compile their own experiences and those of others and also to include the results of experimental research performed in the laboratory. It is indeed gratifying to observe this enthusiasm of medical writers on a subject which not so long ago was considered foreign to recognized practice. What has been true of books has also been true of medical literature in general on physical therapy. There are now available quite a few weekly and monthly periodicals dealing with light, heat, electricity, massage and the other physical measures utilized for therapeutic purposes. Unfortunately, there still exists a desire to print everything that is written without close scrutiny for the facts and for observations based on extensive clinical data. This indiscretion is prevalent because many publications lack a sufficient amount of scientific material to fill its pages.

Publications, whether periodicals or books, are recognized for their value by their contents. There is always an appreciation of a good book if its contents is considered authentic. This is not an insinuation that any of the books on physical therapy which have been published heretofore are not authoritative, but simply a suggestion, that in view of the progress which physical therapy has made, better books should be forthcoming in the future. Until certain methods become standardized, and until electrophysical apparatus is placed on a more uniform basis of acceptance, each author will of necessity adhere to his independent views regarding methods and equipment. In the absence of a standard nomenclature this same difficulty must likewise be contended with. The entire situation is far from satisfactory, but is in a better state now than ever before. Modern physical therapy has advanced, and with this advancement must come improved scientific literary presentations on the subject.

The clinician who is enjoying a large practice and with it a good experience with physical methods is morally bound to lay his results before the profession. There is too often a desire to shirk this duty, permitting reports based on lesser experiences to creep into the medical press. The medical author who is about to publish a volume should not assume that everything appearing in print is authoritative. Before incorporating methods and results of methods, either a close investigation of the work should be made, or it should be duplicated for the purpose of checking the statements claimed in the original contribution. With this plan in effect less questionable publications will appear and there will be no need for sharp and critical reviews.

New books on physical therapeutics are desirable. The shelves are not too crowded. The author who contemplates such a labor would do well to analyze the situation at the outset and to attempt a presentation which meets the requirements of the group to whom he is catering. He would serve his particular readers best if he would write on the subjects in which he has specialized and on which he can unhesitatingly speak with authority. His experience should qualify him to select from the literature the sound and tried statements of fact.

He should not enter foreign specialties simply to consume space, nor should he include descriptions of antiquated procedures if more modern and better ones are available. Finally, physical therapy must rest its accomplishments on the things which are now placed on permanent record. Unless due care is exercised in this undertaking, the skeptic will continue to be even more skeptical, and those who have become adherents of the newer science will rightfully lose their enthusiasm for it.

THE GROWING OF CANCER CELLS

For the past three years, the Copenhagen physician Dr. A. Fischer has been doing research work in the Kaiser-Wilhelm-Institut für Biologie. His studies on the effects of increased oxygen pressure on the growth of cancer cells, which he has been carrying on in collaboration with the engineer Buch-Andersen, have awakened especial interest. At the invitation of the directors of the Kaiser-Wilhelm-Gesellschaft, Fischer gave a further account of his work. He stated that whereas, until recently, researches were confined to cancer tumors, we are now able to grow cultures of cancer cells and normal cells in exactly the same manner as we grow bacteria, and study thus their mode of existence—their biology. Various tissue cells can be preserved indefinitely by growing them outside the organism. Some of the cultures are now several years old—one is 17 years old. The growth and the metabolism can be measured, and the influence of changes in the surrounding medium can be studied. As the carriers of malignancy, it has been possible, with the aid of such tissue cultures, to recognize definite cells; these cells preserve this capacity as long as they survive, and if inoculated into healthy animals produce a cancerous tumor. There is no specific causative agent of cancer; though one might, with reason, designate the cancer cell itself as the causative agent of cancerous disease. The cancer cell is short-lived and has little resistance. It has a modified energy metabolism (marked cleavage of lactic acid even in the presence of oxygen) and possesses marked protein- splitting and cytolytic powers. As compared with normal cells, the cancer cell is very unpretentious as regards nutrition; for example, it can build up its cellular substance from blood serum alone, whereas this does not suffice for normal cells. Healthy tissue cells, on coming in contact with cancer cells, give off substances that accelerate the growth of the cancer cells. In cultures the cancer cells overgrow and stifle all the normal cells. These peculiarities serve to explain the unchecked growth of a cancer tumor in the body. Dr. Fischer called repeated attention to the aid he had received in his researches from the articles by Otto Warburg on the biochemical processes connected with the respiration of the cell. The account of Dr. Fischer was supported by the projection of a film. He showed plainly the physiology of healthy and of diseased cells. As most of the changes in the cells take place very slowly, it was often necessary in the cinematographic reproduction to increase the speed 480 fold. With the aid of a magnification of 60,000, the motions and the growth of the cells could be distinctly followed. Of especial interest was the portion of a chicken's heart, which is part of a 17 year old culture sent from New York and which has been preserved in full growth for two years at Dahlem, near Berlin. *Jour. A. M. A.* **93**:222.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of Archives of Physical Therapy, X-Ray & Radium published Monthly at Chicago, Ill., for October 1, 1930.

State of Illinois, } ss.
County of Cook. }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Disraeli Kobak, M.D., who, having been duly sworn according to law, deposes and says that he is the Editor of the Archives of Physical Therapy, X-Ray & Radium and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — American Congress Physical Therapy, 912 W. Ohio St., Chicago, Ill.

Editor — Disraeli Kobak, M.D., 30 North Michigan Ave., Chicago, Ill.

Managing Editor — A. R. Hollender, M.D., 30 North Michiagn Ave., Chicago, Ill.

Business Manager — A. R. Hollender, M.D., 30 North Michigan Ave., Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a

corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) —None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Disraeli Kobak, M.D.

Sworn to and subscribed before me this 27th day of October, 1930.

(Seal) Joseph F. Wijas.

(My commission expires October 3, 1931.)

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PHYSICAL THERAPY CLINICS

PHYSICAL THERAPY AS AN ADJUNCT IN THE TREATMENT OF HAY FEVER AND ASTHMA *

By CARL B. SPUTH, M.D.

INDIANAPOLIS, IND.

In presenting this subject I am not unmindful of the fact that many of us have our pet theories regarding the causes and the treatment of hay fever, none of which I wish to condemn. Experience has taught me that in the hands of some, certain methods of treatment give good results, while in the hands of others, these same procedures are of no benefit. Failure may be due to faulty technic, a fact which is not thoroughly appreciated by some clinicians. The correctness of applying a method governs the immediate and end results. It is unfair to evaluate the results unless the original suggestions of an author have been followed to the letter. Rose fever, hay fever, summer catarrh, are misnomers. As these terms have been used for so many years and are understood by the profession and laity alike, I shall not attempt a new terminology.

Etiology

The etiology of hayfever is still unsettled. Some authorities claim that allergy is the important factor, while others contend that the hypersensitiveness of the nasal mucosa is due to sinusitis. In my experience I find that nearly all hayfever patients have some nasal pathology such as deflected nasal septa, sinusitis, hypertrophied turbinates, polypi, etc. These cases present a hyperesthetic rhinitis which may be aggravated by the wind borne pollen occurring usually in the spring and late summer. Then, too, we have cases of hyperesthetic rhinitis as a result of the ingestion of certain foods. It is also claimed by some that the blood calcium plays an important role in the causation of hayfever and hay asthma. The parathyroids have a definite action on metabolism. Their function is the regulation of calcium metabolism and detoxication.

Heredity as a cause of hypersensitiveness is still held by some workers, but is not borne out by my observations and experience. It is immaterial what the nature of the external irritant is so far as its relation to the theory of heredity. To simplify the etiology for working purposes, the following classification is suggested:

1. Inhalants.
2. Bacteria.
3. Foods.
4. Hypocalcemia.
5. Endocrines.

The inhalants may not be the primary cause of hayfever, but they are unquestionably the exciting cause of seasonal hayfever.

Symptomatology

The cardinal nasal symptoms are sneezing, nasal obstruction and mucous discharge. These reactions usually come on very suddenly and begin with violent attacks of sneezing, followed by difficult breathing and profuse nasal secretions. Frontal headache is usually associated with these attacks, due to the swelling of the mucous membrane which blocks the ostia of the sinuses. The sense of smell also may be interfered with. Conjunctivitis, itching and burning sensations of the eyelids, and lacrimation is nearly always associated with the nasal symptoms.

Rhinoscopic examination shows the pathologic changes to be bilateral. Depending upon the severity of the attack, the mucous membrane is more or less swollen and of a pinkish-gray discoloration.

Diagnosis

The diagnosis of hayfever or hayfever-asthma is based upon:

* Read before the Ninth Annual Meeting of the American Congress of Physical Therapy, St. Louis, Mo., September 8, 1930.

1. History: — a detailed clinical history should be obtained to ascertain whether or not the symptoms occur only during a certain season of the year or whether they are present throughout the year. In taking the history we take not only the patient's history, but also inquire about the family history, in which we include the immediate family, grandparents, uncles and aunts. We also try to get a thorough knowledge of the environment and the diet of the patient.

2. Rhinoscopic examination: — By this means we find a similar rhinologic picture in each nostril, namely, edema and generalized hyperplasia of the mucous membrane. The membranes are usually of a pinkish-gray color, and sometimes completely block the nasal passages. The secretions may be either thin and watery or thick mucoid in character.

3. Sensitization:—We employ only Timothy, Orchard, Blue or June Grass and Redtop for the spring reactions, and Short Ragweed and Giant Ragweed for the late summer symptoms.

Treatment

During the past ten years I have used many forms of treatment for hayfever, but in my hands none of them has proven successful. I shall therefore only outline the treatment used for the last three seasons including this year.

1. All nasal deformities, pathology, sinusitis, etc., should be corrected. Needless to say, no surgery should be performed during attacks of hayfever or asthma.

2. I attempt to raise the blood calcium index. For adults I prescribe parathyroid and calcium lactate tablets, give them infra red over the chest and face, followed by general body radiations of ultraviolet. For children the treatment is the same with the exception that I prescribe a glass of milk to be drunk 30 minutes prior to the treatment instead of giving them parathyroid and calcium lactate. My reason for this is that animal calcium is absorbed better than the chemical. These treatments are begun about five weeks before the onset of hayfever and are given three times a week.

3. Just prior to the onset of hayfever symptoms, I treat the nose according to the filtration method which is as follows: Swab the nasal mucosa with a 2% cocaine solution, and follow with an application of Rhinoform. It is imperative that all of the mucous membrane be covered and especially the middle turbinate region and the naso-pharynx. The Quartz Mercury High Frequency electrode is now applied to each nostril, beginning with five minutes and increasing the time up to twenty minutes.

4. Psychology:—I am convinced that the psychologic reaction is an important factor in the management of hayfever patients. You must gain the confidence and cooperation of your patient and assure him that he has nothing to fear. He must take his treatments regularly and faithfully if the results are to be favorable.

Patients who come to me during the hayfever period are treated as outlined under No. 3.

By the treatment outlined I have succeeded in eliminating symptoms of hayfever and hay asthma in many of my patients, and in only a few instances did mild symptoms occur. By the relief obtained, patients who formerly changed their climate during the hayfever season remained at home and attended their usual occupations.

Report of Cases

Case I.—C. B. S., Jr., Male, age 17 years. Family history negative. Personal history: In perfect health until time that he was weaned. When put on modified cow's milk he showed an alarming reaction every time he was fed. This reaction consisted of urticaria all over the body. The mucous membranes also would swell. He undoubtedly had an anaphylaxis for the protein in cow's milk, and upon a change in diet he thrived fairly well. At the age of four years he showed his first symptoms of rose fever which began in the month of May and hayfever which started early in August. The following year his symptoms were more severe, and in addition he had asthmatic attacks during August and September. In 1922 his symptoms were very much aggravated and he did not fully recover from his hayfever and asthma until December. In 1923, 1924 and 1925 he received prophylactic treatment by injection of all of the pollens to which he reacted, with little benefit. In 1926 and 1927 he was treated only by injections of the giant and dwarf ragweed pollens, increasing each injection up to tolerance. In addition his diet was regulated and internal medication was given. This treatment had but little influence on his hayfever-asthma. Hypodermic injections of adrenalin were necessary to control the attacks. In 1928 he received treatment as outlined above with good results. He had no asthma and was able to swim and play baseball, football and other games with his friends, something he was unable to do for several years previously. In 1929, he had a slight recurrence of hayfever which was

controlled by two treatments of the filtration method and he was free from symptoms for the remainder of the season. In July, 1930, he had a rhinitis with considerable nasal discharge. This was successfully treated by zinc ionization. This boy has developed into a fine, strong lad, is a freshman in high school and participates in all forms of athletics.

CASE II.—Mrs. H. E. H., a woman, age 42. Family history—all four of her sisters have had hayfever for years, but none of them has ever had asthma. Father and mother also had hayfever but no asthma. Personal history: Hayfever and asthma for 10 or 12 years. Has tried various treatments without results. In fact, last year she was obliged to give up her position as buyer in one of the large stores in Indianapolis and go to the hospital, where oxygen had to be administered to her. During March and April of this year she had such a severe attack of asthma that the hospital physicians and attaches despaired of her life. The muscles of her neck and shoulders became so rigid that she was unable to speak or move.

I began treating her on June 26 of this year following the plan as outlined. So far the results have been very favorable. She has had no hayfever nor asthma to date. When one considers that at about the same time last year she was in the hospital receiving oxygen treatments, he is able to appreciate what these physical procedures have accomplished. She has been doing her daily work without any loss of time and has indulged in motor trips in the country, something that she has not been able to tolerate for several years.

Conclusions

1. Nasal applications with the Quartz Mercury High Frequency electrode, which gives a combined radiation of ultraviolet and high frequency is of distinct value in the treatment of hayfever.

2. Regardless of the internal medication, general body radiation with infra-red followed by the ultraviolet decidedly aids in relieving asthma associated with hayfever.

24 Stokes Bldg.

Discussion

DR. IRA O. DENMAN (Toledo, Ohio): I just want to ask the doctor if he has treated any of these cases generally, omitting any intranasal treatment, and compared results. My feeling is that in the absence of septal spurs or deflections, the general treatment outweighs in importance anything you can do locally.

DR. OSCAR B. NUGENT (Chicago, Ill.): In the past few years I have been leaning more and more toward physical methods as aids to the usual treatment for these conditions that have been stubborn to manage. The experienced rhinologist knows that nasal surgery is not always successful. Some patients respond to simple shrinkage of the middle and inferior turbinates. It is often difficult to determine which cases are strictly surgical and caution must be exercised in finally advising surgical intervention. If physical methods will offer promise of relief they warrant a thorough trial. Certainly the experience of the essayist has been favorable enough to encourage me to duplicate his work.

DR. E. G. LINN (Des Moines, Iowa): I want to ask the doctor one or two questions. He spoke of the use of ultraviolet, which I suspect most of us have used. I attempted to take care of my hayfever cases during one season with the ultraviolet alone. I felt that the success justified the method of treatment, in that the attacks in several of the patients were shortened, no return being evidenced in some instances. The next season I thought I was not so fortunate, that the ultraviolet did me less good. I have used the hay-fever serums and found much satisfaction in them, and I am using them now.

Having set aside the ultraviolet, I shall again return to it, as the essayist stated that he, too, is obtaining good results with this therapy!

Sampson believed that with the ultraviolet rays he could relieve many cases of hay-fever. I did not follow up his experiments. He has had a very large experience and no doubt his technic was perfected to a high degree.

Dr. Sputh spoke about Rhinoform, a silver albuminoid. Do you use the active or the milder preparation?

DR. SPUTH: Both.

DR. LINN: The active Rhinoform is quite drastic and ought to have a definite effect. But I should like to emphasize what has already been said, that if there is a pocket in the nasal cavity wherein the spurs may accumulate, hayfever is very likely to result. I think there should be a free ingress and digress of the air current, so that secretions may be swept away easily.

DR. CARL B. SPUTH (Indianapolis, Ind.): When I first planned to write on hay-fever and asthma, I wanted to discuss the various forms of treatment, but I thought I wouldn't have enough time. Then, too, as I stated before, I do not want to condemn any type of treatment because I might not have carried it out correctly, and probably that was the reason I didn't get favorable results.

I have tried the pollen injections. I have tried simple nasal treatments. I have tried surgery. As stated in my paper, it is imperative that we put the nose in as nearly normal condition as possible. That means not only the removal of spurs, but also adequate therapy for such pathology as may be present.

I have also tried the body treatment, internal treatment, without any nasal treatment, which helped in the asthma, but did not have much effect upon the hayfever. I find that we have to use general body treatments, whether internal or with physical measures, as well as nasal treatments in order to get the desired results.

I became interested in hay-fever, primarily because my boy has it. The first case that I reported

was my son. You know when lightning strikes home you get busy. Wherever possible I visited anybody who had a new type of treatment for hayfever. You would be amazed at the result obtained in my boy. Three years ago, during the season, he had to be kept in the house all the time. Some nights I would have to give him three or four injections of adrenalin for purposes of relief. He is out playing football today in the ragweed, and it does not precipitate the hayfever.

I am sure that if it had not been for the fact that my own boy had hay-fever I would not have worked so hard along these lines. There is only one drawback to the method suggested, and that is the element of time for a single treatment. It eventually consumes more than one hour. From an economic standpoint this is indeed objectionable, but the end result merits our patience and consideration for the patients afflicted with this annoying malady.

CURRENT NEWS AND COMMENT

The drive for new members is on. Every fellow of the Congress is urgently requested to carry out the pledge made at the business session of the last annual meeting, and that is, to sign up at least one new member. If everyone would do his part the roster soon would consist of one thousand names of active fellows. The Congress needs this new growth. This is the tenth year, and for the anniversary meeting in 1931, let us be able to submit a membership roll of which we will be proud. Applications can be had by writing to the Executive Secretary, Suite 716, 30 North Michigan Avenue, Chicago.

The educational department of the Congress will be glad to furnish physical therapy programs for hospital staff and county society meetings. There are several qualified speakers in various parts of the country who are available for this purpose. The committee who has charge of the educational work invites correspondence with secretaries and will cooperate with them in arranging such programs as are suitable for special occasions.

Manufacturers are invited to submit articles and illustrations of new apparatus. An adequate amount of space will be set aside in each issue of the *Archives* for the description of new equipment which meets with the approval of the committee in charge of the particular current for which the apparatus is employed. The article must be as brief as possible without setting up claims which have not been substantiated by clinical or laboratory experience.

The technicians' bureau has enrolled several qualified physical therapy technicians who are seeking positions in institutional departments of physical therapy or as assistants to physicians engaged in physical therapy as part of their practice. Fellows having knowledge of vacancies will confer a favor upon the bureau by corresponding with the Executive Secretary of the Congress in Chicago.

The Peoria County Medical Society was addressed, September 16, 1930, by Dr. John S. Coulter, Chicago, on Physical Therapy in General Practice.

A New Journal on Cancer

A new medical publication to be called the *American Journal of Cancer* will make its first appearance, January 1, it is announced. It will replace the *Journal of Cancer Research* and will be the official journal of the American Society for the Control of Cancer and the American Association of Cancer Research Workers. It is stated that, for the first time in one journal, research workers can read about the educational and clinical side of human cancer, and clinical members of the medical profession will be brought in contact with cancer research throughout the world. The *Journal* will be issued by the Chemical Foundation, New York, with Dr. Francis Carter Wood, editor.

The Faraday Centenary

The Royal Institution is making arrangements for the celebration in September, 1931,

of the discovery by Michael Faraday of electromagnetic induction, in which lies the origin of the dynamo and the whole of the utilization of electrical power for the service of man. On Aug. 29, 1831, he wound two coils of wire on to the opposite sides of a ring of soft iron, connected one coil to a battery and the other to a galvanometer, and at the make and break of the circuit connected with the battery found deflections in the galvanometer. From this simple experiment has grown the science of electrical engineering, including its medical applications. In a preliminary announcement the Royal Institution says: "No other experiment in physical science has been more fruitful in the benefit of mankind." Other scientific organizations are cooperating in the celebrations, including the Institution of Electrical Engineers, the Royal Society and the British Association. The Federal Council of Chemistry will participate in a Faraday exhibition, for Faraday's chemical researches are hardly less remarkable than his electrical—his isolation of benzene and his establishment of the laws of electrochemistry. Faraday kept a careful diary in his own hand of all his experimental work. For sixty years this diary has been the most treasured possession of the Royal Institution, which has resolved to publish it in full. Some of the six or eight volumes will be ready for the centenary.—(*J. A. M. A.*, Sept. 13, 1930.)

Effect of X-Rays and Radium On the Tobacco Plant

At a meeting of the Forestry Section of the British Association at Bristol, Prof. T. H. Goodspeed stated that the tobacco plant had been found to be very sensitive to exposure to treatment by x-rays and radium. If developing sex cells of the plant were irradiated and seeds afterwards developed, these seeds, when sown, gave rise to plants which might be very different from their parents, whereas seeds from untreated plants gave the same sort of plants as the parents. If seedlings or seeds were exposed to irradiation changes might also ensue in the plants derived from them. By this sort of treatment the biologist could bring new sorts of plants into existence, and it seemed likely that under natural conditions new plants might occasionally be produced by the action of radium in the crust of the earth. —*Brit. Jour. Radiol.*, 3:451, October 1930.

Matter and Space

Most experts at the Meeting of the British Association at Bristol are reserving opinion about the paper read by Dr. Dirac, enthusiastically but provisionally blessed by Sir Oliver Lodge, until they have an opportunity of studying the full memoir in the Proceedings of the Royal Society. But Dr. P. A. M. Dirac is a young Cambridge man whose published work on de Broglie's theory of wave mechanics was regarded as a very striking contribution, and anything he says deserves serious attention.

Mathematicians, who use symbols instead of figures, find it as easy to deal with what the ordinary person regards as unreal things as with real quantities. Sometimes it happens that theorems embracing such unrealities are subsequently found to have a real application. For example, we have experience only of three dimensions but mathematicians can pursue their equations quite as easily with four, five, six or more dimensions, and a four-dimensional geometry was ready for Einstein when he found it necessary to make time a fourth dimension in this theory of relativity. In the same way we can conceive only of positive energy as being a reality, but mathematicians, by changing the sign for the symbol of a quantum from positive to negative, can work out their theorems equally well. It is thus possible to imagine a body endowed with negative energy, and such would have to have energy taken away from it if its acceleration, whatsoever negative acceleration may be, were to be increased, or energy added to it if its negative acceleration were to be decreased.

It is on a conception of the existence of quanta of negative energy that Dr. Dirac appears to have based his theory. By this means he can imagine space to consist of neutral energy, which, however, we cannot appreciate in any way simply because, being neutral, it has no reactions. But somehow a negative electron is pulled out from space and there is thus created the proton, the opposite number of the electron. Matter came into existence, so to speak, by the disruption of space. But why the proton should have a mass 1,850 times that of the electron is as yet unexplained, as also are many points in Dr. Dirac's theory, which at present seems more metaphysical than physical.—(*The Times*).

Cathode-Ray Testing of Synthetic Sapphires

Vast numbers of sapphires are used each year as jewels for bearings in meters and other electrical instruments. Many of these precious stones are, of course, natural. Others, however, are synthetic, and it is important to know which is which.

A method said to be unerring in detection of the two kinds of stone, is by means of the cathode-ray tube. As explained, the method is altogether simple, calling only for exposure to the rays when the stones themselves tell the story.

Trays of unclassified stones are exposed to the rays for a few seconds in a darkened room. All of the stones, with the exception of one natural variety, glow or radiate colors while under exposure. When the rays are turned off, the natural sapphires cannot be seen, whereas the synthetic stones continue to glow.—*Dun's International Revue* (New York), September 1930.

Italian Claim to Priority in Heliotherapy

In an article in *Il Policlinico* (37, p. 137, Jan. 27, 1930) Gaetano Cairo claims Italian priority for the modern application of sunlight to disease, saying that Vanzetti availed himself of it in chronic joint disease at Padua in 1853, and that the first marine hospital in Europe was founded at Viareggio in 1856, by Joseph Barellai of Florance. Cairo has used it with benefit in phagedenic ulcers, burns, frost-bite, bedsores, neurotrophic ulcers, and in many other lesions of that extensive class dominated by nutritional disturbance of circulatory and nervous origin where the tissues betray a lack of vitality and are atomic. Bardenheuer succeeded in a few weeks in bringing about cicatrization in an x-ray ulcer long resistant to various treatments. Syphilitic ulcers which had remained torpid under specific treatment and manifested little tendency to heal have been effectively cured by sunlight.

Great possibilities for the study of heliotherapy exist, according to the author, in the field of gynæcology. He quotes Aimes as devoting a chapter to this subject in his book, published in 1914, and as referring especially to the cases treated about 1882 by Sneguireff of Moscow.

Cairo believes that the method of gradually accustoming the patient should be adopted in all cases, increasing the exposed area daily until full sunbaths are administered, and lengthening the time until several hours of exposure are borne each day without severe reaction.—(*T. B. J. of A. and P.*, October 1930.)

Congress of Physiotherapy, Liege

The fifth International Congress of Physiotherapy was held at Liege from 14th to 18th September, 1930, and attracted a large number of members representing thirty-three different countries. The Congress was organized under the presidency of Professor I. Gunzburg, and was divided into five sections, viz.: Kinesitherapy, Radiology, Hydrotherapy, Electrology and Actinology.

The most striking feature of the Congress (writes a representative of *The British Journal of Actinotherapy and Physiotherapy*) was the paucity of the British contribution to the success of the proceedings. Only four papers by British authors appeared in the programme, and the number of British doctors who attended the Congress was well under a dozen. It was, in the circumstances, all the more unfortunate that Britain was so poorly represented, since American members took so prominent a part in the proceedings. It is easy to understand the prevailing Continental impression that there is little enthusiasm for physiotherapy in Britain.

The Congress opened on Sunday, 14th September, when registration of members took place at the University. The exhibition of physiotherapeutic apparatus opened at the same hour, but early inspection of the exhibits was somewhat hampered by the fact that the process of washing the floor was still being carried on. In any case, the exhibition was of very limited scope and dimensions; only six firms took part, while three thermal stations showed a few photographs. The well-known electro-medical firm of Aug. Demblon (Antwerp) showed a good selection of apparatus, and the new Borosini colonic lavage system was shown in a modified form. Space was reserved for the Geissler apparatus, but apparently this had not arrived before the conclusion of the Exhibition.

A reception of welcome was held on Sunday evening, and the proceedings proper were opened on Monday in the University buildings. After a meeting of the whole Congress, the various sections separated to hold their meetings in different rooms throughout the building.

Meetings, general and sectional, continued throughout Tuesday and Wednesday. There were many papers to be read, and it was apparent that to some extent the programme had got out of hand. A number of papers had to be omitted, and in general there was some difficulty in discovering at what hour and in what room any particular paper was being read. This confusion was doubtless due to the very extended programme which had been arranged. It is easy to criticise such points of detail; but it should be remembered that no Physiotherapy meeting on a similar scale has even been even attempted in Britain!

On Tuesday evening the members were received by the Burgomestre at the Hotel de Ville.

On the evening of Wednesday, the official banquet took place at the Hotel Continental, and on Thursday the members were taken by auto-car to Spa, where the famous bathing establishment was inspected under the guidance of Dr. Wybauw. The visitors were then the guests of the municipality at luncheon, after which they were shown over the factory where Spa water is bottled for exportation.

The Congress terminated at the University of Liege later on the same afternoon, when reports by the Presidents of the various sections were presented. Invitations to hold the next Congress in America and Switzerland were laid before the meeting, but it was decided to hold the matter over for later consideration.

In general, the Congress was a very successful demonstration of the wide interest taken in physiotherapeutics on the Continent, and the important status it has achieved. Depite some defects in organization, the Congress as a whole proceeded smoothly, and was much enjoyed by all participants. The opportunities for friendly intercourse between representatives of many nations were much appreciated.—(*The B. J. of A. and P.*, October 1930.)

Scientists at the University of Wisconsin report a series of experiments which show rather conclusively that "daily exposure of cows to sunlight has little effect upon the antirachitic potency of milk." Cows must be fed rations which contain Vitamin "D" ready made, in order that their milk will keep children from having rickets.

Learn These Facts About Cancer

Truths that everyone should know about cancer are listed in an article in the April *Hygeia* by Dr. Francis Ashley Faught.

Cancer begins as a single spot and is at first always a local disease; as such it is removable and permanently curable.

Cancer never dies out of itself, but continues to grow until it destroys the life of the person in whom it grows.

Cancer is not a blood disease; it is the abnormal growth of normal cells in the body.

Cancer is in no way infectious or contagious.

Cancer chooses to attack diseased rather than healthy parts; therefore cancer may be considered in some instances a preventable disease.

Precancerous conditions are those which are not yet cancerous but may become cancerous if neglected.

Chronic irritation is a definite precursor of cancer.

There is no safe, simple serum, drug or other remedy for cancer.

Surgery, X-rays or radium, singly or combined, are the only known methods of treatment.

The periodic health examination is a valuable preventive measure against cancer.

The incorporation of the Radiological Research Institute was announced July 24 by Dr. Edwin C. Ernst, St. Louis, president of the organization. One of the first objectives will be the production of X-ray tubes of a power now unavailable in order that deeper penetration and faster action can be obtained. Other objects of the society are cheaper radium, American control of its own radium supply, establishing a central radiological research laboratory, fostering pure radiological research in colleges, cooperating with the National Institute of Health created by Congress, and establishing an advisory board of fifty scientists to extend the practical application of X-ray research to all walks of life. There are nineteen original members of the Institute.

A National Postgraduate School of Radiotherapy

A momentous step in the history of radiotherapy in this country (England) is the setting up of a National Post-Graduate School of Radiotherapy, at the Mount Vernon Hospital and the Radium Institute, a collaboration of interests which owes its origin to the good offices of the Radium Commission. It is recognized by all concerned that one of the pressing requirements of the present situation is to increase the number of effective workers in radiotherapy, and to educate those workers in the latest and most efficient developments of both radium and x-ray therapy. It is hoped that every reliable aspect of the technique will be available for study at the new School, with the exception of "bomb" treatment, which has been allocated by the Commission to the Westminster Hospital Radium Annexe.

The National School of Radiotherapy is to be administered by a joint committee, which also includes representatives of the University of London, the British Institute of Radiology, and the projected British Post-Graduate Hospital and Medical School. The representative of the B.I.R. is Dr. Stanley Melville, and it is hoped that the Institute may play some responsible part in the teaching activities of the new School, of which Sir Cuthbert Wallace will act as Director.

The first of a series of educational courses in radiotherapy is to be held over the four weeks commencing October 6. Lectures will be delivered at the Radium Institute in Ridinghouse Street, where the out-patient and follow-up departments will be situated, together with a certain number of in-patients, but the majority of the clinical teaching on in-patients will be done at Mount Vernon Hospital at Northwood, Middlesex.

It should be added that Mount Vernon Hospital has issued an appeal for financial support from the public, to enable it to play its future role to advantage. A new x-ray department is projected, and the new wing of the hospital, when complete, will raise the number of beds to a total of 250.—(Editorial, *Brit. Jour. Radiol.*, October 1930.)

Accepted Devices for Physical Therapy

The following have been accepted by the Council on Physical Therapy of the American Medical Association for inclusion in its list of accepted devices for physical therapy:

Austin's Irrigators. — Austin's Irrigators (W. D. Peattie, Inc., Cleveland, Ohio) are designed for "dilating the sphincter muscles" and "for continuous irrigations," particularly in "the use of extreme temperatures in (irrigating) liquids." It is claimed for the apparatus (1) that complete dilation and thorough cleansing is accomplished; (2) that the vaginal types permit long, uninterrupted douching; (3) that the rectal types permit long, uninterrupted irrigation; (4) that they are made of material which permits the use of irrigating liquids of high or low temperature; (5) that the apparatus may be taken apart and sterilized thoroughly; (6) that it is easily tolerated by the patient; (7) that any soluble antiseptic may be used; and (8) that the irrigators or tips can be made a part of any irrigating apparatus. The Council on Physical Therapy believes that these claims are reasonable and not unwarranted.—(*Jour. A. M. A.*, August 2, 1930, p. 343.)

Sorensen Therapeutic Inhaler No. 922.— The Sorensen Therapeutic Inhaler No. 922 (C. M. Sorensen Co., Inc., Long Island City, New York) is stated to be an electrical instrument giving warm, dry air for the vaporization of inhalants. The device is constructed to heat air in sufficient volume to permit of deep and continued breathing direct from the applicators, thus providing the mucosa with a continuous supply of warm air or of warm medicated vapor. It is designed to operate on a 100 to 125 volts, alternating or direct current, and its power consumption is less than 15 watts.

Sorensen Therapeutic Heater No. 921.— The Sorensen Therapeutic Heater No. 921 (C. M. Sorensen Co., Inc., Long Island City, New York) is similar to the Sorensen Therapeutic Inhaler. It is different in that the cold air, instead of being drawn through a heating chamber, is forced through by some type of air compressor. It is claimed to be of value in the treatment of those diseases of the middle ear where the application of warm dry air, or warm medicated vapor, is indicated.—(*Jour. A. M. A.*, August 9, 1930, p. 413.)

Sunlit Ultraviolet Glass. — The window glass known as "Sunlit" (Semon, Bache & Co., New York) is stated to be a glass that transmits the biologic ultraviolet rays of the

sun. According to a test conducted by the Bureau of Standards this glass does transmit an appreciable percentage of the solar rays which have been shown to have antirachitic properties.—(*Jour. A. M. A.*, August 16, 1930, p. 484.)

Bureau Standards Suggest a Measure for X-ray "Doses"

Standardization of X-ray treatments may result from the invention and development at the U. S. Bureau of Standards of an apparatus for standardizing the method of measuring X-ray "doses", it was stated recently by the X-ray Section of the Bureau.

The announcement of the Bureau, which may be of interest to physicians engaged in the use of the X-ray for the treatment of diseases and injuries, was as follows:

In giving X-ray treatments for cancer, it is very necessary to carefully control the X-ray "dose" given the patient, just as the doctor must carefully regulate the amount of a drug that he administers. This is particularly important where it is necessary to give the greatest possible "dose" of X-rays, for, should the "dose" be too great, burns or more serious injuries might result.

Likewise, it is necessary for the doctors to use some standard "dose" so that it may be easily duplicated in all parts of the country and all over the world in order that their treatments may be reproduced and repeated. At present many doctors use small portable measuring instruments called dosage meters, and it is necessary that these be accurately calibrated.

The instrument developed by an associate physicist in the X-ray Section of the Bureau of Standards, Lauriston S. Taylor, enables the accurate measurement of X-ray intensity. The method of measurement consists essentially in allowing an X-ray beam to pass between two metal plates, one of which is connected to a high voltage battery and the other to a sensitive measuring instrument capable of measuring a current of one-one-hundred-billionth of an ampere. The X-rays cause the air between the plates to conduct electricity so that a very small electric current flows through this air and is measured by the sensitive meter. This small current of electricity is proportional to the intensity of the X-rays. Thus an accurate knowledge of the X-ray "dose" may be obtained by measuring this electric current.

Having thus established a standard, the dosage meters used by all doctors can be calibrated at the Bureau of Standards in the accepted unit. In 1927 the standard unit of X-ray intensity in the United States was compared with the European units by an indirect method which has since developed to be unsatisfactory. Consequently, at present there is no assurance that the standard unit in the United States is in agreement with the standards in England and Germany.

This new instrument developed by Mr. Taylor permits of a direct method of comparing the United States unit with foreign units and is much more satisfactory than the apparatus used in the old indirect method. The new apparatus has been greatly reduced in size, weighing only about 20 pounds as against the old instrument which was over 200 pounds. The new type of standard ionization chamber eliminates most of the difficulties encountered in foreign chambers, and possess new fine points in measurements.

The portability of this instrument makes possible direct comparison between the American standard and those in Europe. In the Spring of 1931, Mr. Taylor plans to take the entire new equipment, which is portable, to the standardization laboratories in England, Germany, France and possibly Russia and Italy, where direct comparisons can be made. Until the development of this new ionization chamber, such a thing has been impossible. Being able to take this apparatus over to Europe to make direct comparisons with their standards is one of the salient points in its favor.

At present, the X-ray measurements are standardized in only a very few hospitals in the United States. The instrument developed at the Bureau of Standards is a means whereby the X-ray work in all hospitals can be standardized, and as a result greatly increase the value of X-ray treatments.

At the next International Congress of Radiology, to be held at Paris, France, in July, 1931, Mr. Taylor will make a report on the results of this standardization between the different X-ray laboratories of the world. (*The Ohio S. M. J.* November 1930.)

Light as a Defense Against Disease

The main assembly of the Deutsche Gesellschaft für Gewerbehygiene was held recently in Breslau. During the course of the eventful session, which was attended by some 600 members and guests from Germany, Austria, the Saar region, Danzig, Switzerland, Hungary, Jugoslavia, Czechoslovakia, Poland, Japan and other countries, many papers were presented dealing with the hygienic conditions that must receive consideration in the building of homes and the planning of cities, and also in the organization of industrial plants and in the laying out of offices.

Of especial interest for a larger circle were the words of Prof. Dr. von Drigalski, "stadtmedizinalrat" of Berlin, on the topic "Labor and Dwelling." He called attention especially to the danger of the bacterial content of the air. In the light of present knowledge, it is by no means an heroic experiment to take a deep breath over soil inoculated with cholera bacilli, for bacilli are to be found in the liquids. The large number of relatively harmless causative agents of inflammation contained in the "living dust" of the air is evidently the source of many inflammations of the throat, to which man pays little attention, but also of many rheumatic infections. He demanded an extension of research from the field of rheumatism to that of sore throat. Even if no acute disorder develops, the organism is severely taxed by its constant struggle with the causative agents and is thus weakened in its resistance.

The best means of defense, he said, was light and light surroundings, rooms with white walls. The chemical action of light is underestimated. Whereas red, yellow and, to a certain extent, green light exert chiefly a warming effect, the short-waved rays, toward the direction of the violet, are more chemically active. It was formerly the supposition that the chemical action of light is confined to the skin—that it does not penetrate the deeper layers. Investigations have proved the assumption false. The tanning of the skin by the sunlight is more than a mere "beauty aspect"; it effects a strong stimulation of the circulation and thus also of general metabolism. The chemical action of bright sunlight in living rooms becomes evident through the fact that the bacterial content of the air is thereby considerably diminished or even entirely eliminated.

In addition to the stimulation of light, the so-called work stimulation is important for the preservation of health. Idle tissues not only do not develop but even atrophy. The most favorable frontage for isolated houses is toward the north, since the rooms toward the east and also the rooms toward the west have the sunlight for half a day. The living rooms must by no means be impaired by the use of unsuitable paint and decorations. Foreign Letters: *Jour. A. M. A.* **95**:1362 (November) 1930.

More Than Three A Day

A committee of the Academy of Medicine of Cleveland has submitted a report showing that about 1,100 medical meetings—more than three a day—are held in Cleveland each year. It is not stated how many of these are meetings of the Academy or its sections or how many are meetings of independent organizations; neither is the number of hospital staff meetings stated. The committee expresses the opinion that too many meetings are held and recommends that the Academy reduce the number of its own general meetings and those of its sections. Four meetings annually for the sections on ophthalmology and otolaryngology and a similar number for the section on industrial medicine and the section on orthopedics are thought to be enough while the sections dealing with experimental and clinical pathology are to be allowed eight meetings in a year. The meetings of the Academy itself are to be reduced to six each year, these to be held in September, November, December, February, March and May. Thus the 1,100 meetings are to be brought down to about 1,090 or so. Still there will be three a day, with Sundays and holidays left in. There will have to be some trimming elsewhere than in the program of the Academy.

The situation in Cleveland as revealed in the report of the Academy's committee is altogether similar to that existing in many cities, some of them much smaller than Cleveland. In one about one third as large 1,768 medical meetings were reported as having been held in one year.

Some of these days we are going to make an effort to find out just how many medical meetings are held in the whole United States and why, and how many of them are meetings of independent groups and why. In the mean-

time it might be in the interest of physicians and the public for county, district and state societies to find out whether they are holding as many meetings as should be held or more than are necessary. While they are about it, they might ascertain, also, whether or not it may be possible for them to do acceptably what some of the independent groups are doing in their respective fields. (*A. M. A. Bulletin,* October 1930.)

Pulmonary and tracheobronchial gland tuberculosis in childhood is elaborated up at length by Hempelmann, (*Jour. Mo. M. A.* November 1930) and this author under treatment discusses the subject of heliotherapy. "A word of warning should be given concerning the use of heliotherapy. This remedy, whether direct sunlight or some other form of ultraviolet ray, is often very beneficial in certain forms of surgical tuberculosis but may be positively harmful when there is an active process in the lungs. In the latter type of infection, if heliotherapy is used at all, it should be with the greatest caution for it is capable of causing hemoptysis and an exacerbation of the pulmonary symptoms which may have the gravest consequences."

The electrocoagulation of tonsils is discussed in an article by Daly in the October issue of the *Journal of the Medical Association of Georgia.* Technic is stressed as an important factor in obtaining successful results.

In discussing the subject of chronic empyema in children, (*Jour. Mo. M. A.* November 1930) Montgomery has this to say about exercise: "The amount of exercise the patient takes should be controlled entirely by a consistent gain in weight and no temperature. When a loss of weight is registered or the patient has a rise of temperature, any active physical exercise should be limited to the army type of setting up or Camp's daily dozen, rather than competitive play. There should be a definite time, graduation and regularity to this exercise, and it should also be carefully supervised. My favorite system of exercise consists of blowing bottles, graduated deep inhalations, and the inner and outer windmills. In the latter, one swings the straight arms crossing them over the chest in the largest possible circle. The curvatures and deformed chest in these chronic cases respond rapidly when good progress is made in the five cardinal points that have been mentioned here in the cure of empyema."

The New Physics

Confidence in the uninterrupted order of law in the course of natural phenomena is based, after all, upon only modest successes achieved by human research in the intellectual coordination of natural events. This confidence has, therefore, no absolute character. Even today many are influenced by a feeling of opposition to the postulate of any unbroken order of laws. It is not easy for us to look upon our acts of will as dependent upon strictly causal sequence and to waive our faith in the spontaneity of our actions. "We can indeed do as we like, but we are compelled to like what we must do" means a bitter pill for proud man. . . . Despite our conviction that practical life cannot get along without the fiction of a free will, the doctrine of uninterrupted causality is in no serious danger of a threat on the part of philosophic psychology. Especially, experiences concerning the action of internal secretions, of hypnosis, and of certain poisons upon psychic reactions, have had the effect of fairly well silencing opposition from that quarter. Today faith in unbroken causality is threatened precisely by those whose path it had illumined as their chief and unrestricted leader at the front, namely, by the representatives of physics.—Einstein, Albert: *The Drift of Civilization: A Symposium,* New York, Simon and Schuster, Inc., 1929.

Guides for Graduate Study.—The New York Academy of Medicine has published booklets to aid visiting medical men. "The Synopsis of Approved Opportunities for Postgraduate Medical Study in the Clinical Specialties" lists courses and residencies. "Opportunities for Postgraduate Medical Study Offered in New York City" has been revised to include a map showing important hospitals, facilities which the academy offers to visiting medical men, approved courses and residencies, fellowships, nonoperative clinics and conferences, clinical and pathologic conferences and ward rounds. Copies of the foregoing may be obtained from the New York Academy of Medicine, Fifth Avenue and One Hundred and Third Street, New York.

THE STUDENT'S LIBRARY

BOOK REVIEWS

DIATHERMY. Medical and Surgical in Otolaryngology. By *Dan McKenzie,* M.D., F.R.C.S.E., Consulting Surgeon, Central London Throat and Ear Hospital; Otolaryngologist to the French Hospital, London. New York, The Macmillan Company, 1930. Cloth. 184 pp. Illustrated. Price $4.00.

Only one chapter of this interesting little volume is devoted to the uses of medical diathermy in otolaryngology. Four chapters are given over to surgical diathermy. In view of the extensive clinical experience with medical diathermy in diseases of the ear, nose and throat, this division of the subject seems somewhat unbalanced. It is true that surgical diathermy has acquired a more prominent position because of its value in cancer destruction. Nevertheless, the importance of medical diathermy in numerous affections of the specialty of otolaryngology should not be under-estimated.

Chapter I is devoted to a consideration of the physical nature of the high frequency current. While the exposition is rather brief, it is authentic and gives at once a good review of the apparatus and the current it generates. The application of medical diathermy is discussed in Chapter II. Brief notes appear on the pharynx and the larynx and also the nose. More detail is included on the treatment of the middle ear. In this much is abstracted from the work of Leroux-Robert, although the method of the author is somewhat different though not sharply original. His contact with numerous American writings on deafness has unfortunately been neglected, and, therefore, due credit is not given to contemporary workers for their contributions to this particular phase of the subject. In general, the chapter shows a meager experience with medical diathermy in otolaryngology and would better have been omitted, restricting the contents of the book to surgical diathermy.

In the discussion of surgical diathermy on nonmalignant disease, the tonsils are given due consideration. McKenzie states that he has performed tonsillectomy always under general anesthesia, as, in his opinion, it is difficult to obtain local anesthesia of the pharynx sufficient to prevent all sensation of heat, dragging, and pain, at the perceiving of which the patient is apt to wince and so to interfere with our manipulations. General anesthesia is employed reluctantly by American workers who engage in electrosurgical removal of tonsils because of the hazards incident to sparking, but in the hands of the experienced surgeon, general anesthesia should be successful for this procedure. Differentiation is made between enucleation by dissection by the diathermy knife, or by the arc incision and piecemeal extirpation of the tonsil. For the latter procedure the author concedes that local anesthesia is adequate, but adds that towards the close of the treatment when we are nearing the capsule, it is well to supplement the surface anesthetic with deep injection into the peritonsillar region, and, perhaps, also into the pillars, of 2 per cent Solution Novocain or B-eucaine.

Other considerations in this same chapter include innocent neoplasms of the pharynx, adhesions of the naso-pharynx and papilloma of the larynx. Simple neoplasms of the nose, face and ear are also given space.

Probably the outstanding part of this book is its treatise of surgical diathermy in cancer. It promptly demonstrates a large personal experience with this agent in malignant disease of the ear, nose and throat and the reader can gain much from a perusal of this section. Mention is made of the comparative merits of diathermy and radium. The entire section is divided into eradicable and ineradicable cancers, a simple but comprehensive classification for therapeutic purposes.

THE SKIN REACTIONS, BLOOD CHEMISTRY AND PHYSICAL STATUS OF "NORMAL" MEN AND OF CLINICAL PATIENTS. By *William F. Petersen,* M.D., and *Samuel A. Levinson,* M.D. Department of Pathology, University of Illinois, College of Medicine, and the Research Laboratory, Municipal Tuberculosis Sanitarium, Chicago. Cloth. Pp. 327 with numerous charts and tables. Chicago: American Medical Association, 1930.

This book represents a remarkably painstaking effort "to correlate a number of measurable biologic reactions observed in normal persons and in patients, with each other, with clinical symptoms and with resistance to an infectious disease, i.e., tuberculosis." It is beyond a doubt the most substantial and best organized single contribution "concerning the vegetative status of the individual, more particularly the status of the vascular system and the epidermis" that has been published in recent years. We are informed at the outset that these studies have had their inception because of the interest of one of the authors (Petersen) in the problems of nonspecific resistance to disease, i.e., allergic phenomena and the abnormal behavior of the individual during derangement of the autonomic system. The basis or background of their studies is an attempt to interpret in detail the reaction of the individual to various skin stimulations or injurious insults to tissue. The investigation was conducted on a group of 100 so-called normal men. The method employed was by blistering the skin with cantharidis, burning with Kromayer lamp, injuring the skin with ice, injection of epinephrine hydrochloride, intacutaneous injections of pharmacologic

preparations. There is also included a study of blood chemistry, the basal metabolic rate, the age, weight, the electric reaction of muscles in milliamperes, the resistance of the moist skin for direct current, etc. For purpose of greater classification the authors also incorporated case reports of clinical material, autopsy reports and a conservative analysis of their findings. The numerous charts and tabulations have a tendency to interfere with the basic arguments of the thesis. It is so richly interwoven with the text that one is reminded of the inability to see the forest for want of the leaves. The detail is great and the thesis is an example of the orderliness of scientific method in research.

The last section of this book brings together the many apparent loose threads of research and formulates them into a coherent discussion and deduction in regard to the effect of the above mentioned agents in exophthalmic goiter, the nervous patient, and the glaucomatous and tubercular patient. The exophthalmic patient apparently suffers from a constitutional disorder grafted from an unstable nervous system, a striking increase in capillary permeability which is not necessarily related to an increase in the basal metabolic rate. From this, the authors are inclined "to the view that we are dealing with two distinct factors — one an underlying change in tissue reactivity, and another which is distinctly related to the calorigenic effect of the thyroid secretion." The nervous patient was found to have a distinct increase in permeability of the capillaries, a relatively low level of potassium, (K), a practically normal level of Calcium (C), and a high resistance of the skin to the electric current.

In regard to tuberculosis, the authors have introduced therapeutic studies merely to illustrate several points in their deductions. They feel that "in the intricate biologic picture of inflammation presented by tuberculosis, innumerable possibilities exist — We would, however, reiterate that in clinical tuberculosis, it is the vascular mechanism that must always be in the foreground of consideration." An exhaustive amount of experimental labor, therefore, was devoted to determine the reactivity of this mechanism. The tissues or skin were subjected to the influence of various stimuli. It was found that pilocarpine made the capillaries more permeable but there was the danger of dissemination. Epinephrine, unfortunately, was found to have a dibasic action. Pituitrin, because of its specific action on the cell membrane, had a lessening effect on the permeability of the capillaries and should, thus, have a favorable effect on the clinical picture. Alkalinization is of value on the basis of its ability to reduce the abnormal hydrogen-ion concentration. The authors have also studied the possibilities of special diets "cures", specifics and dismissed them with a conservative estimation of their limitations and possibilities. They close their discussion with the following statement: "We have the conviction that if we once begin to plan the therapeutic attack in tuberculosis less from the point of view of the immunologists and pharmacologists and more from that of the inflammatory reaction and its physiologic and physiochemical aspects, we shall be able to devise a more rational therapy." This book is the most stimulating contribution that the writer has had the pleasure of reviewing in recent years. It is so extraordinarily "meaty" that it must be read in leisure moments. A profitable intellectual investment is assured to those who venture to brouse through its pages.

ULTRAVIOLET RADIATIONS AND THEIR USES. By *Robert Aitken,* M.D., F.K.C.P.E., Lecturer on Diseases of the Skin, Edinburgh University. With a foreword by Sir Norman Walker. Cloth. Pp. 208, with 15 illustrations. Price, 10/6 net. Edinburgh: Oliver & Boyd, 1930.

This small volume presents a conservative estimation of the clinical value of ultraviolet radiation. It attempts to discuss the theoretical and practical aspects of the subject in an impartial and critical manner. There is a short foreword by Sir Norman Walker wherein he indicates his admiration for the author for the service of furnishing the medical profession with a compact "summary of the present knowledge of the Ultraviolet Radiations and of their uses as Therapeutic agents".

The book is an orderly digest of the generally accepted opinions in regard to the theories and therapeutic uses of ultraviolet radiation. The material has apparently been well selected and fairly well organized. The author has, however, leaned too confidently upon a great number of opinions by various writers without resorting to a personal check of their conclusions. While it may usually be commendable and also safe to cite a large variety of authorities in general medical contributions, the parallel does not hold in the present instance. The constant shifting of opinions in ultraviolet therapy and the theories of radiation makes it necessary to have a first hand knowledge of the topics under discussion, or at least an authoritative check-up. It is observed that the author, in many instances, was content to abide by the opinions of others and to express opinions with a finality that is not in keeping with the shifting information on the photodynamics of this energy. Several cases in point may be cited. In his chapter on the "Physics of Radiation", the author has selected probably the weakest, although the most popular theory on the arrangement of the electron and atomic constitution, namely, that of Bohr, as the keystone for his exposition on the electronic theory of matter. There are about, or at least, ninety-two fallacies to this theory, for it practically fits the experiences of only one element—Hydrogen.

In regard to the rays that are therapeutically effective, the author makes the unequivocal statement that the "selection of ultraviolet rays shorter than 2000 Ängstrom Units is of no importance therapeutically." Such a statement is clearly dogmatic and has no basis in fact. Modern science is constantly demonstrating the therapeutic possibilities and actualities of rays below 2000 Ängstrom Units as well as those above the accepted limits of the ultraviolet range. For a better appreciation of this we call attention to the work of Plotnikow and Plank, two extraordinary workers in the field of

Radiation whose contributions have not been mentioned in the text of this work. No doubt, had the theoretical section of this work been expanded to a more generous size, many of the statements would have been amply qualified.

The chapters on the "Biological Effects of Light" and the "Theories of Action and Pathological Effects of Light" are satisfactory examples of lucid exposition and concise summaries of the existing information on the subject. As the author approaches the practical side of the subject he demonstrates his thorough orientation by the clear presentation of the value of light treatment in a large group of selected conditions. This portion of the book contains some of the finest evaluations of the clinical effects of ultraviolet therapy. The statements are conservative, and sometimes sharply critical. The author's intention apparently is not to sell the therapy of ultraviolet to the profession but rather to awaken interest and point out some of its glaring fallacies. Here, also, it might be pointed out that the author in several instances accepted the conclusions of several of his authorities either too uncritically or without personal experience. We refer particularly to his remarks on page 185 in regard to Drummond's opinion that irradiated milk becomes unpleasantly tallowy in odor, or unpalatable, and has its Vitamin A content destroyed by oxidation. This information is somewhat obsolete in the light of the more up-to-date work on this particular subject wherein milk under proper irradiation is found to be palatable and without rancid odor. Nor does it necessarily lose its Vitamin A content.

This book is recommended to the reader because of its lucid exposition, honest evaluation of the subject, and the very practical and satisfactory interpretation of the uses of ultraviolet therapy in selected clinical conditions.

THE EFFECT OF ROENTGEN IRRADIATION ON THE INTERRELATION BETWEEN MALIGNANT TUMORS AND THEIR HOSTS: A Study. By *Karl Krebs*. Paper. Pp. 133 with tables and illustrations. (Acta Radiologica Supplementum, VIII.) Stockholm. P. A. Norstedt & Sons. 1929. Price, Sw. Cr. 8.

The details of this study were carried out in the Roentgen service of the Aarhus Municipal Hospital. The monograph is based on a series of interesting problems that frequently confront the serious student, and upon the solution of which the author has attempted to throw some light. They are: 1. "How large a dose of roentgen is needed in order to produce a lethal effect on the cancer cell? 2. Is it possible to demonstrate any effect on cancer cells from doses that do not kill the latter? 3. Is it possible by local roentgen irradiation, either to increase or lower the resistance of an organism to a cancer tissue implanted either intracutaneously or subcutaneously in the exposed tissue?"

All the experiments were conducted on mice in which were implanted a carcinomatous and sarcomatous growth. Studies were then conducted on these tumors by directly irradiating the growth *in vitro* and immediately implanting it subcutaneously, and, also, by irradiating the tumor *in situ* and directly implanting a portion of it in other mice. "The degree of roentgen effect was measured by (1) the proportion of takes, (2) the duration of the life of the animals after transplantation, (3) the length of the period of latency, and (4) the rapidity of growth; the two latter constituting what we have termed the 'energy of growth'." The book is an example of meticulous research, checked many times by careful controls. The exposition is lucid and is strengthened throughout by an exhaustive bibliography. The conclusions are so interesting that we incorporate them in this review. The author's results are: "Only doses of over 6 HED produced a directly lethal effect. In the case of the two tumors used in these experiments, the lethal dose was the same for the sarcoma and carcinoma, and the same whether the tumor was irradiated *in vitro* or *in situ*. Smaller doses lessened the energy of the growth of the tumor. The inhibitory effect showed itself partly in a lengthening of the period of latency, partly in a diminished rapidity of development. It was found that preliminary irradiation of the skin increases the power of the organism to resist a tumor subsequently implanted either subcutaneously, or intracutaneously in the exposed region. The effect was most distinctly noticeable when the implantation was done subcutaneously, and in the case of the less virulent carcinoma — — —" We do not wish to present the entire conclusion of the author for fear of depriving the reader of the pleasure of first-hand reading. The reader interested in the subject (and at present the subject of cancer is of universal interest) will find this monograph a rich contribution to the research of cancer and the effect of various degrees of irradiation.

INTERNATIONAL ABSTRACTS

Die Behandlung Der Erkrankungen Des Vorderen Bulbusabschnittes Mit Buckys Grenzstrahlen. (Treatment of diseases of the anterior segment of eye-ball by Bucky's borderline rays). J. Krasso.

Ztschr. f. Augenhlkde., 1930, Bd. 71, H. 1/2. (April), p. 1-12.

Krass obtained good results by the irradiation of corneal erosion, herpes corneae, vesicular keratitides of unknown origin, filamentous, dendritic, and punctate keratitis; also, in contaminated erosions, superficial infiltrations and ulcers of various form and etiology, episcleritis and scleritis. The therapeutic results obtained in these diseases are as good as or better than those due to irradiation with ultraviolet rays, radium or x-rays. The advantages of the borderline rays are the short exposure time, painlessness of treatment, shortening of healing process, absolute innocence of irradiation for the deeper layers of the eye, owing to slight penetration, and for the technician because of the notable absorption by air. Besides, there is the possibility of repeating irradiations at short intervals without the danger of cummulative effect. Finally, it must be noted that the equipment is relatively cheap; it can be connected with the ordinary main current. The technic of irradiation is simple. The dose used two to three times was 70 to 150 r with a half layer value of 0.020 mm Al at from 2 to 14 days intervals.

Der Begriff "Ischias". (The meaning of "sciatica"). H. Jansen.

Ztschr. f. d. ges. physik. Ther., 1930, Bd. 38, H. 4, (Febr.) p. 124-134.

In every genuine sciatica there is a change in consistence, a tension or even a state of contracture in the ipsolateral lumbar extensors and the glutaelis medius. It is this primary myalgia which, under certain circumstances, leads to sciatica. The procedure recommended by the author for its treatment is as follows. When a neuralgic condition prevails, bed rest and packing of the lower limb with wool or cotton wad should be used; frequently, immobilization of the lower limb, even by an extension bandage will prove advantageous. Patients should not sit up for eating, and should defecate in lying-down position or when sitting on a close-stool. Anodine medicaments should not be spared! But beware of opiates! Remedies which are at the same time good diaphoretics are best; it is possible that perspiration itself plays a part, as possible exudates located in the muscles or nerves, are thereby diminished. When the case has somewhat subsided, but Lasegue's symptom is still inferior to 60 degrees, then mild heating procedures should be begun with without interrupting bed rest: electric pads, irradiation by incandescent lamps or hot air arranged for use in bed, hot packs and such like. When Lasegue's symptom is 60 degrees or somewhat over, bed rest can be somewhat relaxed and then massage treatment is absolutely indicated; neuralgia has now receded and the patient is still suffering from his underlying lumbo-gluteal myalgia. Massage has to combat the latter affection; for that purpose it should be combined with a previous energetic heating, in that the patient lies under an incandescent light arc or hot air box. The extent of the massage has absolutely to be confined to the lumbar musculature and gluteus medius. The painful spots on the inferior end of the lower limb ought to be omitted from massage. When relief has continued, advancing universal massage can be applied to the whole of the limb to prevent the inevitable atrophy. Massage may at that time be combined with Swedish gymnastics. After having undergone massage for about one month, the patient can be allowed to get up and gradually to prolong his stay out of bed; the massage is continued even though the patient is ambulatory.

Behandlung Des Muskelrheumatismus Im Greisenalter. (Treatment of muscular rheumatism in old people). R. Krueger.

Medizin. Welt, 1929, Jg. 3, H. 40, (Oct.) p. 1440-1441.

In old age, the system has lost its capacity for defense against the changes of temperature, seasons and weather. The blood supply of senile muscles is inefficient because of the presence of arteriosclerosis; there is, moreover, a general atrohpy of the muscular tissue, as shown by the microscopical evidence of muscular changes, such as proliferation of nuclei, fatty degeneration, etc. It is, therefore, easily understood that old people are frequently affected by muscular rheumatism. Treatment has to consist in hyperemization of the diseased parts. Hot, full baths, or partial packs with fango or mud, are of course barred from use because the demands made on the cardiovascular system are too great; so is massage on account of hemorrhages frequently occurring in the muscles treated in this manner, and probably due to the easy fragility of the vessels. Old people should, therefore, be confined to bed and the diseased parts be especially hyperemized by electric pads or hot bottles. Attention is to be paid to the patients frequent changes of posture because of the danger of hypostatic pneumonia as well as to avoidance of skin burns. This may especially occur when hot bottles are used often or in patient's who have anesthetic areas. In such cases the author omits the internal use of salicylates.

Elektrische Behandlung Bei Herz-Und Gefaesskrankheiten. (Electric Treatment in Cardiovascular Diseases). A. Schurig.

Med. Welt, 1930, Jg. 4, Nr. 26 (June), p. 925-926.

Electrical treatment exercises an exceedingly favorable influence on the functions of the circulation. It often relieves the most tormenting complaints, promotes rest and good sleep and strengthens the heart muscle. A distinction must be made between currents of low and high voltage. The direct, the faradic, the alternating, the condensator, and the Leduc currents belong to the former. The galvanic current, when used directly, i. e., not in full or four cell bath, produces a definite strengthening influence on the heart muscle; the dosage and treatment time should however be weak and small as regards the duration and amount of the current. The treatment should last about 5 minutes and the dosage about 2 milliamperes at most. Neurosis of the heart, unstable pulse and conditions of nervous excitement are contraindications to its use. While it is possible in galvanotherapy to introduce an exact dosage measured by the ammeter, one must on the contrary be guided by the feeling of the patient as to the intensity of the faradic current to be applied. The author prefers to apply it directly by placing one plate, approximately corresponding to the size of the heart, on the cardiac region, and the other, twice its size, on the back. The duration of treatment is from 5 to 15 minutes, depending upon the cardiopathies, i. e., whether associated with dilatation, angina pectoris and aortitides.

Instead of the alternating current in whose application several accidents have happened, the author uses the condensator current by the aid of four electrodes, wherein two are applied to the shoulders and two to the thighs, the hands being placed on the thigh electrodes during treatment. The current is gradually increased to such a degree as to cause a pleasant tremor of the whole system. The effect has been very gratifying in cases of cardiac debility and dilatation. The current can also be administered in the four cell bath. The effect is due to the irritation of the skin as well as in the muscular vibration which acts on the peripheral circulation.

Rumpf's current, the high frequency and the diathermy current come under the category of high voltage currents. Rumpf's current furnishes oscillating currents. The shod feet are placed upon a metal plate connected with the one pole of a small induction-coil, while the flask filled with black-lead is attached to the other pole and moved to and fro along the chest, back and neck from 5 to 10 minutes. Brilliant successes are obtained by Rumpf's current in all nervous conditions, but it also proves useful in angina pectoris. The high frequency current does not display any particular effects. On the contrary a definite heating of the heart can be achieved by the diathermy current, whenever it is applied where dilatation of the cardiac vessels and a better blood supply of the heart are desired. Consequently this current is of value in myocarditis, angina pectoris and in all affections associated with feelings of oppression. A course of from 10 to 15 treatments, two to three times a week, of 10 to 15 minutes' duration is apt to give relief.

The Result of the Combined Surgical and Radiological Treatment of Cancer Mammae at Radium Hemmet 1921-1923. Nils Westermark.

Acta Radiologica. **11**:*1-32 (May) 1930.*

To obtain some idea of the value of the radiological treatment in cancer of the breast, the author has compared the results obtained at Radium-hemmet with those obtained by surgical treatment of cancer mammae in Sweden. The result of this comparison, as beween cases of cancer mammae only treated by operation and those combined with radiological treatment, is as follows:

In those treated surgically and radiologically a 5-year freedom from symptoms is obtained in a relatively greater number of cases. The surgical statistics in Sweden show a 5 year freedom from symptoms in 5 percent of the cases. The cases treated preoperatively were 40 percent. The endothermic cases which in this investigation were found to be greatly involved show a freedom from symptoms in 6 percent. The radiologically treated show freedom of symptoms in 8 percent of the cases after a period of observation lasting more than 5 years. In the combined treatment the interval before any signs of local recurrence was about the same as after the surgical treatment. On the other hand there was a very much longer interval before the distant metastases were manifested in cases treated with radiation and surgery than in those treated with surgery alone. The local recurrences occur much less frequently after the combined treatment than after surgical treatment alone. The duration of life after the appearance of the first symptom and after the commencement of treatment is much longer after the combined therapy than after surgical treatment.

Roentgenschaedigung Nach Epilationbestrahlung. (Roentgen Ray Lesions Following Depilatory Irradiation). Karl Hoede.

Strahlenther., 1930, Bd. 36, H. 4 (May) p. 727-731.

Report of the sequelae of x-ray depilation in two women. They were patients in whom a considerable lesion occurred after almost four and nine years, respectively. In the first case it occurred in connection with a dental fistula (osteomyelitis with removal of a piece of the lower jaw), in the second case it was due to the action of a heavy cold. Obviously, the resisting power of the skin was diminished by the roentgen ray treatment and still present in apparently equal intensity for years after the irradiation. In both cases the persistent sequel of irradiation had a more disfigurating action than had the original hairiness. Hoede therefore cautions against the use of roentgen rays in hypertrichosis and recommends the removal of the heavy portions exclusively by way of electroylsis or diathermy.

Die Behandlung Lokaler Affektionen, Besonders Der Mund—Und Rachenhoehle Mit Kuenstlichem Sonnenlicht. (Treatment of local affections especially of the oral cavity and pharynx, by artificial sun-light). Henseler.

Strahlenther., 1930, Bd. 36, H. 2, (April) p. 323-326.

Wessely had obtained good results in the treatment of tuberculosis of mucous membranes by a carbon arc lamp, devised by himself. Apart from the fact, however, that this lamp is complex, difficult to move and fairly expensive, it shares the objection of every carbon arc lamp, especially those with impregnated carbon rods, in that the gaseous and pulverulent combustion or rather evaporation products of the white-hot carbon rods, impregnated with metal salts, mix with the air. This proves to be especially disadvantageous when the oral cavity and the pharynx are irradiated, as the patient must be placed immediately in front of the lamp. The author therefore recommends the Polysonlamp, manufactured by the electric company, Sanitas, in Berlin. This lamp, an ultraviolet radiator, contains as source of light an incandescent bulb of 500 watts, whose glass case, owing to a particular process of fusion, allows the ultraviolet rays, generated in the white hot tungsten wire, to pass unaltered, a parabolic chrome-plated reflector permits a yield of up to 70 per cent. As the ultraviolet intensity of the carbon arc lamp employed by Wessely is greater the exposure time has to be prolonged. The application is to be repeated several times daily when the polyson lamp is used. The latter will be particularly advisable for the practitioner to whom the greatest reduction of exposure time is not of such importance. The carbon arc lamp moreover requires a staff of well-trained technicians and is therefore to be reserved for specialized clinics. The indications for the polyson lamp are identical with that established by Wessely. Deeper seated affections of other kinds, too, such as inflammatory manifestations and septic wounds, can be profusely supplied with ultra-violet rays when the tongue is strongly pushed down by the glass depressor.

Die Grundlagen Der Physikalisch-Diaetetischen Behandlung Des Glaukoms. (The basis of physico-dietetic treatment of glaucoma). E. A. Heimann.

Ztschr. f. Augenhlkde., 1930, Bd. 71, H. 1/2, (April) p. 82-94.

The physical measures locally applied to the eyeball are merely apt to counteract hypertension; consequently it only treats a symptom of glaucoma. In simple glaucoma, the desired effect can be obtained by massage. Massage by finger is not so efficient as vibration massage by the massage cylinder, if carried out several times a day for about ten minutes. An India rubber hemisphere of 3 cm. in diameter has served the author best. It is sometimes amazing how readily the pressure falls as soon as after one sitting; it must however be admitted that there frequently occurs as speedy a rise.

Thermal application should be combined with massage. Irradiation by the *sollux-lamp* or the *Degea-ultraviolet* radiator, containing a great many heat rays, is frequently followed by softening of the eye-ball. This effect becomes, however, still more evident by diathermy, which is best performed by Bucky's glass-tube electrode. In one case of glaucomatous fit the author succeeded in obtaining a marked and even protracted fall of the eye-tension by transverse diathermy through the neck.

Sufficiently good results can, indeed, be obtained by local treatment, but the effect is only symptomatic. Proper treatment should therefore be directed to the restoration of the glaucomatous subject to health. Since glaucomatous subjects suffer from angioneurosis, all the curative factors are indicated which are apt to restore the equilibrium between the sympathetic and parasympathetic nerves. In this respect, the author recommends sport, viz. according to the age and capacity, gymnastics, fencing, bicycling, tennis, and golf, in order to reduce the glaucomatous predisposition. In such patients as cannot afford the luxury of sport, owing to circumstances beyond their control, massage and vapour baths are to be resorted to as substitutes. Bathing "cures" exert no influence on status glaucomatosus, while drinking "cures" prove very beneficial; the Karlsbader Mühlbrunnen acts nearly as a specific. Finally, the dietetic regulation of the metabolism of glaucomatous patients is of importance in-as-much as abstinence from sodium chloride is able to influence the fits in an exceedingly favorable manner as regards their incidence and intensity.

Probleme Der Meeresheilkunde. (Problems of Thalassotherapy). Haeberlin.

Ztschr. f. wissenschftl. Bäderkde., 1930, Jg. 4, H. 8, (May), p. 810.

The chief indications for seaside resorts are as follows: catarrhs of the air passages in which there is not only need for the relatively pure and moist air with its constant temperature and its direct action on the mucous membrane of the air passages, but also for the hardening action of sea-air on the surface of the skin. By "hardening" is meant the training of thermoregulation by the vasomotor nerves of the skin. There is, perhaps, no better method for effecting this training of the blood vessels of the skin in an equally gentle and efficacious manner than are the breezes of the constantly moving sea-air about the skin and the clothed body during a stay in the open air. This action of the cool sea-air stimulates the heat regulating mechanism of the skin and thus prevents undue dissipation of the body heat. It has a direct action on the blood vessels of the skin in the form of friction of the skin surface. Amongst other benefits is the increase in the iodine content in the milk of the cows, sheep and the vegetables. Finally, it is equally of great importance to know that the radiation at the sea-side is biologically far more efficacious than it is on the continent.

Die Finsenbehandlung Der Pocken. (Finsen treatment of small pox). C. H. Würtzen.

Strahlenther., 1930, Bd. 36, H. 2, (April), p. 311-319.

Finsen had in his time pointed to the strikingly good results due to dark treatment, and held that most of the methods then in use in order to prevent scarring (masks, compresses, painting with iodine tincture, etc.) acted by keeping the light off the skin. Finsen however considered small pox therapy associated with complete exclusion of day light to be too rigorous a procedure and thought that a closely drawn red curtain or pane of red glass would doubtlessly be as useful. His method is therefore the "red room". It is, however, of an absolute necessity, that the outer apparatus be faultless, in order that Finsen treatment may not prove a failure. The whole of the chemic light should be excluded and one ought to make sure that the red media are quite up to the mark. Unfiltered light must not be allowed to enter for however short a time. The purpose of Finsen treatment is: prevention of suppuration in the exanthema and avoidance of scarring. Treatment should set in as early as possible. According to the author the fourth day of the disease is the last that offers a chance of success. Finally, it is to be noted that Finsen treatment does not exclude another treatment, but it is only to be carried out in red light.

Kritisches Zur Roentgenbestrahlung Des Morbus Basedowii. (Criticism on x-ray irradiation of Grave's disease). W. Rieder.

Strahlenther., 1930, Bd. 36, H. 1, (March) p. 64-87.

Opinions still differ as to the explanation of the manner in which x-rays act on Graves' disease. In severe cases of exophthalmic goiter the author has not seen any convincing success. In fresh and slight affections, roentgen-ray irradiation is obviously beneficial. Irradiation can be tried at the onset in mild cases, in strongly advanced cases who cannot be operated on and when operation is declined. All the intermediary cases should be operated on. When irradiation is given and a convincing success cannot be evidenced, the attempt at irradiation should not be carried out for longer than four months. Above all, the most favorable moment for operation should not to be missed. Social grounds are to be considered in establishing the indications. Plummer's iodine treatment as preparative to the operation is superior to x-raying. The author feels, that the operative treatment of Grave's disease is far superior to roentgen-ray therapy in regard to the time of treatment and the end-results.

Die Behandlung Der Hauttuberkulose An Der Marburger Hautklinik. (Treatment of cutaneous tuberculosis in the Marburg dermatological clinic). A. E. Ruete.

Med. Welt, 1930, Jg. 4, Nr. 11, (March) p. 351-352.

Patients suffering from lupus vulgarus received general body irradiation and cod liver oil. The exposure time was gradually increased up to an hour. Stronger reactions of the skin and pigmentation should be avoided. Along with the general treatment, local therapy is applied according to the condition of the pathologic process. In case of flat, extensive lupus, in which the nodules are located superficially, the author first makes an attempt at compression irradiation with Kromayer's quartz lamp for the purpose of producing strong local reactions, even to vesiculation. By this therapy the greater part of the nodules disappear. Such as are left behind are treated by cold cautery. When one has to deal with deeper-seated nodules, massive infiltrations and hypertrophic foci, cauterization by pyrogallic acid is done.

Ulcerous lupus, too, is as a rule cauterized by pyrogallic acid. Here, and likewise in the markedly hypertrophic forms, röentgen-ray therapy is indicated. According to the author it must not be applied in other lupus forms. Ugly scars are smoothed by compression irradiation, incipient keloids can be removed by radium treatment.

Beitrag Zur Roentgenbehandlung Chronisch Entzundlicher Erkrankungun Des Auges. (Contribution to roentgen ray treatment of chronic inflammatory affections of the eye). Felix Jendralski.

Strahlenther., 1930, Bd., H. 2, (April), p. 327-335.

Radiotherapy can promote or stimulate recovery of indolent keratitides. In diffuse tuberculosis keratitides, radiotherapy is nearly always efficacious, though sometimes only transient. In parenchymatous heratitis, it cannot prevent the progress of the inflammation, but it usually promotes vascularization and absorption of infiltrations in partially severe cases, at the height of the affection. In severe cases it brings about a change for the better. In the scleritides, radiotherapy represents an excellent therapeutic remedy for promptly removing the inflammation and preventing complications. In *choroiditis disseminata,* roentgen ray treatment is useful insofar as the single foci can thereby be caused to heal more readily. Finally, radiotherapy inhibits further growth of isolated tuberculomas and hastens their involution.

Most of the cases were irradiated from a focal distance of 30 cm. and with 3 mm. Al. filter (4 milliampères, 23 cm. parallel gap). The dose was mostly ½ ND Sabouraud-Noiré; for keratitides and scleritides a ⅓ ND was found to be sufficient. The number of single irradiations depended on the nature of the disease.

Treatment of Asthma by Ultraviolet Rays.

M. J. Saidman alluded to the cases reported by Rouèche (see *British Journal of Children's Diseases,* 1930, xxvii, p. 129), and emphasized the inadequacy of small doses. In his experience better results were obtained by polymetallic arcs than by the mercury lamp. Actinotherapy was most indicated in children over three years of age and in forms accompanied by respiratory catarrh.—(Abst. *The British Jour. Children's Diseases,* Vol. 27:227 Sept. 1930.)

X-ray Therapy In Acute Glomerulo-nephritis.

'La Pediatria,' 1930, xxxviii, p. 361.

G. Salvioli found that irradiation of the lumbar vertebrae gave good results in the acute stages of nephritis, causing in a large majority of cases an increase in diuresis. Haematuria was reduced in intensity often when diuresis, which showed a marked deficiency in the early stages, had returned to the normal. These facts point to a moderating action of the circulatory disturbance, causing a cessation of the vascular spasm which produces the anuria and haematuria. That the vasomotor innervation of the kidney is acted upon by radiation is shown by the fact that no modification occurs in normal kidneys, nor in the haematuric kidney with oliguria which is not in a condition of glomerulonephritis. That the action is not due to cutaneous stimulation is shown by the fact that radiation applied to the thigh is without any effect.—(Abst. *The British Jour. Children's Diseases,* Vol 27:227 Sept. 1930.)

The X-Ray Treatment of Wounds. Leopold Freund.

Brit. M. J., 2:449, Sept. 7, 1929.

The author believes that the beneficial effects of x-rays on fresh and open wounds is not given due appreciation. The patients who have shown a tendency to keloid formation were given small doses of x-ray, instead of stitching or covering the wounds with skin grafts. Good results were always obtained. The rays were used for their destroying influence on the perivascular round cells and spindle cells which play a part of the formation of keloid tissue. The results were also excellent in the treatment of circumscribed patches of lupus vulgaris, epitheliomas and pigmented nevi. The cosmetic results were so satisfactory that the courses of treatment were shortened. This method is not suitable for cases in which the lesion is extensive. Six or seven treatments of unfiltered x-ray in a dose just above the epilation dose, were used.

The Action of Radium Upon the Formation of Blood Capillaries and Connective Tissue. T. Takahashi, M.D. (Tokyo), D. M. R. E. (Cambridge).

The results of this experimental study are expressed in the following summary:

1. Young capillaries and fibroblasts are very radio-sensitive. Their growths are stopped or retarded by five minutes beta and gamma radiation from 15 mgrm. radium element. This dose, however, will not necessarily induce a marked degree of repair because the damage is small.

2. There is still greater inhibition with a bigger dose, *e.g.,* thirty minutes irradiation. But, in this case, injury can be so great that processes of repair are initiated from neighboring parts; and the result can obscure the original inhibitory action of radium.

3. So far as new capillaries and fibroblasts are concerned, the idea that small doses are stimulative while bigger doses are inhibitory receives no support from our experiments, at least within the range of five to thirty minutes irradiations by 15 mgrm. radium (screened by 0.2 mm. of silver).

4. Proliferation of connective tissue and capillaries within the irradiated areas with the bigger doses, which was seen after an interval of one week, is not due to a direct stimulation by radium upon pre-existing cells, but it is the result of regeneration.

I have much pleasure in thanking Miss G. M. Scott for carrying out the irradiations and operations entailed in these experiments, and Professor Russ for his interest in this work. I am also indebted to Mr. B. D. H. Watters for the microphotographs.

Treatment of Carbuncles by Roentgen Ray: Analysis of Fifty Cases. R. V. Light and M. C. Sosman.

N. E. J. of M., 203:574, Sept. 18, 1930.

From a study of fifty cases of carbuncle treated with roentgen ray, Light and Sosman conclude that when benefit occurred it lay usually in a hastened necrosis of the lesion, a softening or liquefaction of a carbuncle in the indurated stage. In a few instances the spreading tendencies of the lesions were checked, and healing occurred by drying up and absorption without any extensive drainage of necrotic products. Roentgen therapy was occasionally employed with success following surgical procedures which failed to halt the spread of the carbuncle, and in these the acidity of the infectious process was diminished and the peripheral spread halted. Relief of pain occurred in some instances of cervical carbuncles and, quite strikingly, in most of those of the face. Of the entire series, thirty-four patients were observed to have been improved by roentgen therapy, and sixteen to have received no benefit from this treatment. Thirteen out of fifteen women patients were improved; three-fifths of the men, when the site of predilection was the neck, were helped by irradiation. Eight of the nine carbuncles of the face responded excellently, as did most of those of the extremities. The proportionate success of roentgen therapy diminished somewhat with the increasing size of the lesion; 75 per cent of those under 5 cm. diameter were benefited, whereas but 60 per cent of those larger than 9 cm. diameter improved as a result of roentgen ray. Diabetes seemed to have little bearing on the chances of success from irradiation.—(Abst. *J. A. M. A.,* Oct. 25, 1930).

Cause of Death from Radium. A. J. Larkin.
Radiology, 15:296, Aug., 1930.

Larkin's experiments on rabbits showed that death due to external radium radiation is associated with loss of body weight, extreme leukopenia, anorexia and apathy. Death due to external radium radiation is associated with marked degenerative changes in the bone marrow and spleen, cloudy swelling in the convoluted tubules of the kidney, granular cytolysis in the liver, and annihilation of the parenchyma of the thymus gland. Lethal dosage varied markedly with the age of the animal; the younger the animal, the lower the dosage required. Death occurred within eighteen days, averaging seventeen days after exposure, and dosage delivered within seven days acted as a unit. Dosage delivered in eight or more days required an increase to be lethal.—(Abst. *J. A. M. A.*).

Klinik Und Roentgentherapie Der Lymphogranulomatose. (Clinic and roentgentherapy of lymphogranulomatosis). Kruchen.
Klin. Woch. 1929, Jg. 8, Nr. 41, (Oct.) p. 1915-1919.

The author summarizes the treatment of lymphogranulomatosis with x-ray as follows: (1). Early diagnosis; roentgent ray examination of the pleural cavity and gastro-intestinal tract; extirpation of enlarging ganglia prior to roentgen-ray irradiation; in case of negative microscopic findings the suspicion of lymphogranulomatosis should not be given up considering the relative frequency of this disease at the age of from 20 to 40 years; repetition of the histological examination. (2). Irradiation of the diseased ganglia and the neighbouring ones. If the symptoms do not recede, one must think of an affection of the mediastinal and retroperitoneal ganglia; sometimes the symptoms, especially those of advanced stages, are due to secondary inflammatory manifestations or other complications (pleuritis, tuberculosis); then only a cautious irradiation is permissible. (3). The amount of the dose to be used depends on the course and type of the disease, its stage, its extension and the individually variable reactive sensitiveness. (4). Besides regular temperature measurement, the blood picture is a serviceable control of the therapy. (5). The stage of the disease is to some extent an aid to the dosage of irradiation, as follows: I. The first stage is the stage of latency with enlargement of glands of often, many years' standing, presenting little, characteristic hyperplastic granulation tissue histologically, with a blood picture of normal condition or a slight increase in the percentage of leucocytes and lymphocytes. The size of the effective dose amounts to from 50 to 80 per cent of S.U.D. The second stage, the stage of reaction with allergic phenomena, implies the change for the worse. Histological finding shows typical limphogranulomatous tissue; blood picture shows hyperleucotysis; size of the effective dose 30-70 S.U.D., if necessary divided, but at short intervals of from 2 to 5 days. The third stage is the stage of exhaustion and transition to cachexia. Histologically: formation of scars, breakdown, malignant growth. Blood picture shows normal or slightly increased number of leucocytes and lymphopenia. Size of the effective dose depends upon the type; treatment should be given in divided doses; cautious roentgen ray therapy is advocated by the author.

The Pathological Action of Light. A. G. Levy.
J. Path. & Bact. **32:***387, 1929.*

The essential action of white light on sensitized tissues and of ultraviolet light on nonsensitized tissues appears to be identical. The result of prolonged irradiation of the mouse's ear is an immediate complete stasis, with subsequent necrosis. The result of less prolonged irradiation is a delayed stasis, with subsequent necrosis. In no case is stasis conditioned by the formation of clots. It is due to an inflammatory reaction accompanied by extravasation of plasma from the vessels and consequent aggregation of corpuscles. The necrotic changes are a consequence of the cessation of circulation. The coagulation of extravasated plasma is a consequence of circulatory arrest. Hardening of the dead tissue is due to mechanical desiccation. Hypertrophy and infiltration of the epithelium are striking results of irradiation which is insufficient to produce general stasis. The hypertrophy is definitely shown to result from a brief period of irradiation.—*Abst. Amer. Jr. Diseases Children,* **40:***627-628 (September) 1930.*

Changes in the Blood Cholesterol in Children Following Inunctions of Hydrous Wool Fat and Irradiation. Jerome S. Leopold and Adolph Bernhard.
Arch. Pediat. **46:***756 (Dec.) 1929.*

The literature is reviewed. Eleven children, convalescent from various diseases, were studied; determinations of calcium, phosphorus and cholesterol were made. Hydrous wool fat was rubbed over the entire body. The patients were then exposed to the light from a quartz lamp at a distance of from 27 to 30 inches (68 to 76 cm.) for five minutes. The time of exposure was increased until a maximum of fifteen minutes was reached. The experiment was continued over a period of sixteen days. After ten exposures the calcium, potassium and cholesterol values were again determined. A third series of determinations was made two months after the treatment was begun. The usual mixed diet was given and this was not varied. No attempt was made to give foods supposedly rich in cholesterol. Six of the eleven cases showed a rise in cholesterol ranging from 20 to 80 per cent. In two cases the rise was 10 and 16 per cent, respectively. The greatest rise was seen in a colored child. In one case in which only the ultraviolet light was used there was no increase in cholesterol. Since hydrous wool fat contains a considerable amount of cholesterol and cholesterol esters, the authors conclude that the rise in cholesterol may be due to absorption through the skin. Further studies are being undertaken.—*Ab. Amer. Jr. Dis. Chil.,* **40:***665-666 (Sept.) 1930.*

Ueber Die Roentgenbehandlung Der Paget-Disease. (On Roentgen Ray Treatment of Paget's Disease of the Nipple). J. Muende.

Dermatol. Wochenschr., 1930, Bd. 90, Nr. 20 (May) p. 687-689.

Report of a case af Paget's disease. Although there was a purely epidermal process in the author's case and large fields were irradiated with high roentgen doses, the roentgen ray treatment proved to be insufficient. The recovery was only partial, for a progressive relapse developed after a short time so that eventually it was necessary to perform a radical operation. It also appears from this that in superficial Paget's disease the danger of relapse cannot be assured by roentgen ray treatment. Therefore, the treatment by roentgen rays should be discarded in both the purely epidermal cases of Paget's disease as well as for cases in which the epithelium of the lactiferous glands was involved.

Die Bedeutung Rhythmischer Stroeme In Der Elektrotherapie. (The Importance of Rhythmical Currents in Electrotherapy). G. Oppenheim.

Med. Welt, 1930, Jg. 4, Nr. 22 (May) p. 792.

A form of appliance of rhythmical currents which has aroused increasing interest these latter years, is the so-called surging current whose rhythm is not composed of single pulsations but of slowly increasing and decreasing pulsations. Such surging currents are particularly adapted to the treatment of muscular palsies, as they produce true muscular *movements,* instead of muscular *twitching.* In addition, their soothing effect in treatment of neuralgias and neuritides seems to be greater than that obtained by the routine passage of the current. The author has had a simple apparatus constructed resting on thermal principles for the purpose of rhythmical interruption of electric currents. When such an apparatus is allowed rhythmically to interrupt the heating current of a current-redresser tube, every current sent through the tube from whichever source becomes a surging current in accordance with the gradual onset and close of the glowing of the heating thread of the tube.

Tonsillectomy by Diathermy Using Surface Anaesthesia. Warner Collins.

Lancet. **1**:*859 (April 19) 1930.*

The advantages of diathermy as cited by the author are: 1. It needs no general anesthesia. 2. It causes no shock of any kind. 3. It entirely eradicates the tonsil. 4. It carries no risk of hemorrhage, primary or secondary.

The largest tonsil can be treated from two points of application while the majority can be destroyed as one single unit. The author describes the technic of the operation in detail and remarks that he does not think the method suitable to children under 14 years of age.

The process described is strictly a combination of true diathermy and fulguration. The operation is said to be practically painless.—*Amer. Jr. Dis. Chil.,* **40**:*661 (Sept.) 1930.*

Constitutional Modifications in Children Under the Influence of Climatic Cure. Dmitrieff, Dernoff and Vasilieff.

Rev. franc. de pédiat. **5**:*483 (Aug.) 1929.*

At the sanatarium at Eupatoria during the summer of 1928, eighteen children between 6 and 15 years of age were studied relative to their reactions expressive of a vagotropic or sympatheticotropic type. From this study of the type of dermatographism, the oculocardiac reflex and the response of blood pressure to the injection of epinephrine, the authors conclude that the children undergo a vagotropic reconstruction as a result of the climatic cure. There was a corresponding shift in the leukocyte formula in the direction of a lymphocytosis and an eosinophilia. There was also some depression of the mobilization of blood sugar in response to epinephrine. Studies of the chlorides and uric acid of the blood were inconclusive.—*Amer. Jr. Dis. Chil.,* **40**:*655 (Sept.) 1930.*

The Treatment for Open Pulmonary Tuberculosis with Vitamin D (Viosterol). H. Menschel.

München. med. Wchnschr. **77**:*239 (Feb. 7) 1930*

Menschel reports good results in the treatment for tuberculosis with concentrated viosterol. Most of the fifty-eight patients were adults who were under treatment with viosterol for six to twelve months. Roentgenograms and physical signs indicate that exudative processes in the lungs were absorbed and that there was healing in many cases by scar formation in from four to six months. The incidence of pulmonary hemorrhage was greatly reduced. The patients expectorated less, their temperature was lower and they gained in weight. The diazo reaction changed from positive to negative during the treatment. Tuberculosis of the bones, larynx and skin also showed a tendency to heal. Twelve of the sixteen cases of laryngeal tuberculosis showed improvement in from one to two months. There was no change in cases of intestinal tuberculosis. There was no improvement in the secondary anemia, which was, however, benefited by liver and arsenic therapy. Large doses of viosterol (16 mg., three times daily) caused vomiting, leukocytosis, anorexia and loss of weight. Injury to the kidney was not observed. The therapeutic dosage is five drops of a 1 per cent solution of viosterol once or twice daily.—*Ab. Amer. Jr. Dis. Child.,* **40**:*648 (Sept.) 1930.*

Specificity of Light Action in Tuberculosis. Winthrop M. Phelps.

J. Bone & Joint Surg. **12**:*253 (April) 1930.*

The component parts of natural sunlight differ greatly, not only in different localities, but even from hour to hour in the same locality; hence, if natural sunlight is to be used in the treatment for disease, it is necessary to measure the actual amount of radiation given. The apparatus used by the author is described. Various filters were used to screen our undesirable rays of the sun's spectrum, and carbon arc lights with a known spectrum were also used. The results obtained are shown in tabulated form.

The author's conclusions can be summed up as follows: 1. Heliotherapy in tuberculosis can be carried out as effectively at sea level as elsewhere. 2. Longer exposures can be given if the erythema and tan-producing rays (from 300 to 320 millimicrons) are absent or of small quantity. 3. Wave lengths between 320 and 380 millimicrons were shown to be active, and this band is present in carbon arcs of 25 amperes or more, using carbons of known spectral distribution. 4. Sinuses were not directly exposed to the light and the results were excellent.—*Ab. Amer. Jr. Dis. Chil.*, **40**:*664 (Sept.) 1930.*

The Amount of Ultraviolet Radiation Necessary to Cure Rickets. G. H. Maughan and J. A. Dye.

Brit. J. Actinotherapy. **4**:*260 (March) 1930.*

The rays having therapeutic value may not be the same for different diseases, but for rickets they lie in the ultraviolet near the line 2,968 Angström units. A certain percentage of these rays penetrate the epidermis and reach the blood capillaries in the dermis, from 0.2 to 0.5 mm. beneath the surface. In chickens exposure for one minute a day at a distance of 22 inches (55.8 cm.) would cause a cure of rickets in 95 per cent. When ten minutes' irradiation was given, only slightly better results were obtained than with the short exposure.—*Ab. Amer. Jr. Dis. Chil.*, **40**:*629 (Sept.) 1930.*

Removal of Tonsils by High Frequency Currents. Matthew F. C. Zubak.

W. Va. M. J. August, 1930.

In summarizing his remarks, Zubak states: "Three types of high-frequency currents are offered by manufacturers in compact outfits. The method is especially applicable to patients unable or unwilling to undergo hospitalization and routine general or local tonsillectomies can be offered as alternatives. Despite opinions to the contrary electrosurgery of tonsils is proving successful. "Fulguration is used for the removal of shallow growths or small amounts of diseased tonsil tissue. Surgical diathermy or electrocoagulation removes tonsils by repeated treatments with minimum risk. Cutting current (radio knife—arc cutting) is used in needle and snare replacing scalpel and cold snare in usual local tonsillectomy or in modification of new tonsil technic proposed by Fowler."

Results with the Hipprocratic Biers' Method of Cauterization in Childhood. S. Wolff.

Jahrb. f. Kinderh. **123**:*328 (April) 1929.*

In three cases that had failed to respond to the usual modes of therapy, S. Wolff utilized Biers' method of cauterization. In two instances this was a life-saving measure (staphylococcus endocarditis gravis after scarlet fever and severe endocarditis after scarlet fever). In a third child who had been running a fever of unknown causation for months after an attack of scarlet fever, there was a prompt cessation of the fever three days after the cauterization.—*Ab. Amer. Jr. Dis. Chil.*, **40**:*665 (Sept.) 1930.*

Carbon Arc Light Treatment in Bone and Joint Tuberculosis. Katharine Pardee.

J. Bone & Joint Surg. **12**:*270 (April) 1930.*

A Schwartz high intensity carbon arc light was used in the treatment of twenty-two children during the winter months.

Judging by the change in the blood cells, weight and general appearance, there was a definite improvement in sixteen, slight improvement in three, no change in two, and one child was apparently made worse. The lower the hemoglobin reading at the start of the treatments, the greater the increase under treatment. This same statement applied to the number of red cells in the blood. During the winter months the average child tends to lose weight, whereas in the group studied there was an average gain of nine-tenths pound (408 Gm.). The children were more animated, made more noise and ate better.

Roentgenograms were taken in all of the children in the group, as well as in seven children in a control group. All of the children showed improvement in the roentgen observations whether in the exposed group or the control group, especially in the production of fusion in joints, but the results in the untreated group did not approximate the results in 85 per cent of the exposed children.

Thirty-three per cent of the children showed a rapid initial rise in blood counts followed by a fall. It is suggested that the continuous treatment may have been more than the children could well tolerate and that lesser dosages of light might produce better results. Blonds do not respond as well as brunettes.

Sinuses that were not directly exposed to the light healed, whereas those which were directly exposed did not, although there was marked improvement in the condition of the surrounding skin.—*Ab. Amer. Jr. Dis Chil.*, **40**:*664 (Sept.) 1930.*

Erholungserfolge Bei Kindern In Hoehenklima. (Recreation Effects in Children by Mountain Climate). Marianne Heinz.

Klin. Woch., 1930, Jg. 9, Nr. 23 (June) p. 1076-1078.

The foregoing study included an investigation of the patients' weight, the content of hemoglobin, the muscular force and fatigability, the vital capacity and the reaction of the vasomotors. After a residence of from 6 to 8 weeks the amount of hemoglobin had increased by 55 per cent; at the check-up performed after six weeks' favorable effects could be ascertained in 47 per cent, as compared to the initial value. Investigations done by the ergograph showed an increase in muscular force and decrease in fatigability. There was also a certain adjustment of cardiac activity to the demands in labor. Vital capacity had increased in 47 per cent. Finally, observations covering the body weight curves demonstrated a gain in weight by climatic action.

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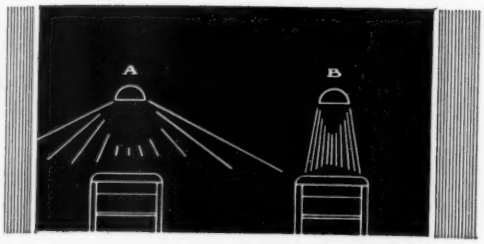

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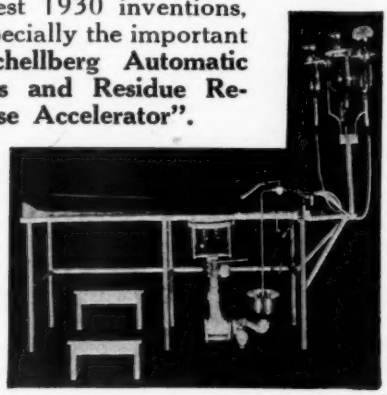

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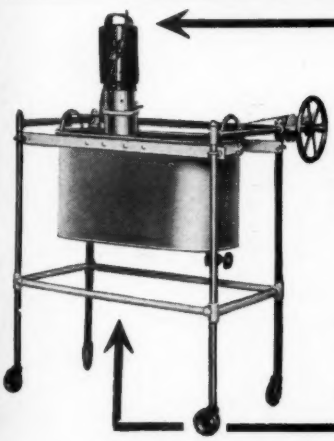

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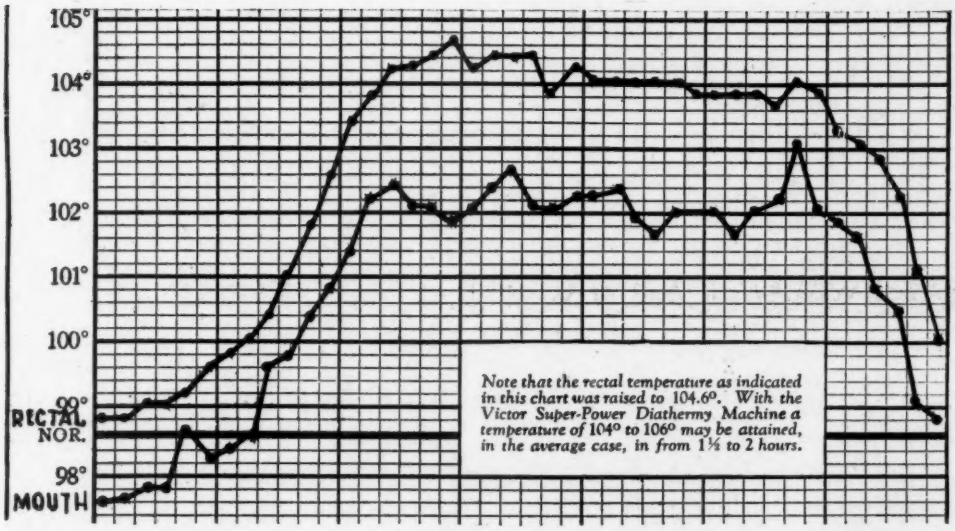
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100°
99°
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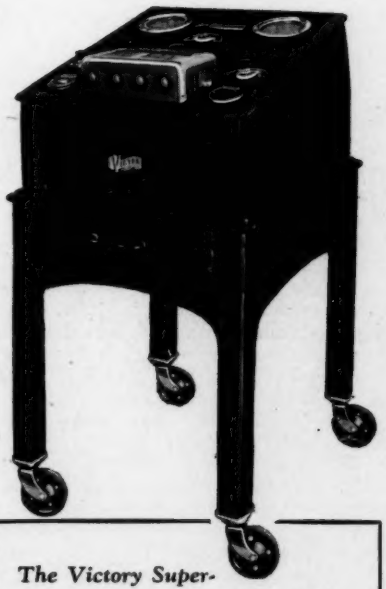

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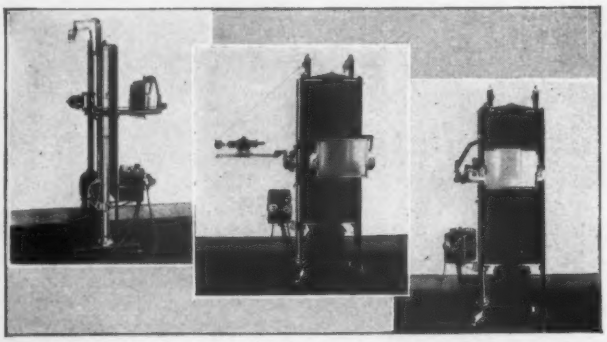

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